

Safety Management System
Argonne National Laboratory
October 21, 2005

**INTEGRATED SAFETY MANAGEMENT (ISM)
PROGRAM DESCRIPTION**

Revision 10

**ARGONNE NATIONAL LABORATORY
October 21, 2005**

Approval
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Revision Log

<u>Rev.</u>	<u>Date</u>	<u>Change</u>
0		Original document; never submitted to DOE, but reviewed internally.
1	7/01/1998	Original ISM Program Description submitted to DOE.
2	1/07/2000	The revision contains editorial changes and includes specific to ANL-W documents as was suggested as an opportunity for improvement in the DOE pre-verification review conducted in May 1999.
3	Undated	Initial revision based on comments from ISM Verification. Document submitted for internal review. Revisions were significant from previous version; entire format was changed.
4	7/31/2000	Based on the DOE ISM Verification, the ISM Program Description has been entirely rewritten to reflect the changes requested by DOE.
5	3/19/2001	The ISM Program Description, rev. 4 dated July 31, 2000, has been updated to reflect the ANL reorganization of ES&H responsibilities to further concentrate ES&H authority, responsibility, and accountability in the Argonne divisions.
6	2/25/2002	The ISM Program Description, rev. 5 dated March 19, 2001, has been updated to reflect the ANL reorganization of the Directorate, to reflect the new ESS&H Committee, to better describe the environmental safety program, and to clarify the wording throughout the document to make it clearer and more accurate.
7	3/19/2003	The ISM Program Description, rev 6 dated February 25, 2002, was updated to reflect the position of the Chief Scientist in the Directorate that was not included in the past and to clarify wording within the document.
8	1/15/2004	The ISM Program Description, rev 7 dated March 19, 2003, was updated to reflect the addition of the National Security Coordinator in the Directorate, to update the committees and their charters, to update the Tier documents listing, and to update references made in the document
9	1/31/2005	The ISM Program Description, rev 8 dated January 15, 2004, was updated to reflect the transfer of ANL-W to the INL, to include the newly formed Nuclear Safety Committee, and to update the ANL organization. The Environmental Management System (EMS) Description Document was added as Attachment A.
10	3/10/2005	Based on DOE comments clarifying references were added to the ISM document regarding the EMS attachment document. ISM section 4.2.2 was revised from "construction management" to "project management" (which includes construction) and the more encompassing project management program was described.
11	10/21/05	The EMS Program Description was revised to address the August 19, 2005 comments from an Independent – Gap Analysis Review Team.

Acronyms

ADS	Activity Data Sheet
AES	Area Emergency Supervisor
ALARA	As Low As Reasonably Achievable
ALD	Associate Laboratory Director
ANL	Argonne National Laboratory
APS	Advanced Photon Source
ASPM	Accelerator Safety Procedures Manual
ASRC	Accelerator Safety Review Committee
AST	Applied Science and Technology
CAIRS	Computerized Accident/Incident Investigation Reporting System
CEMP	Comprehensive Emergency Management Plan
CFO	Chief Financial Officer
COO	Chief Operations Officer
CSR	Criticality Safety Representative
ECR	Environmental Compliance Representative
EMS	Environmental Management System
ERF	Environmental Review Form
ES&H	Environment, Safety, and Health
ESS&H	Environment, Safety, Security and Health
EQO	Environment, Safety and Health/Quality Assurance Oversight (ESH/QA Oversight)
FWP	Field Work Proposal
ESH&I	Environment, Safety & Health & Infrastructure
HR	Human Resources
JHQ	Job Hazards Questionnaire
JUSC	Joint Union Safety Committee
LDRD	Laboratory Directed Research and Development
NEPA	National Environmental Policy Act
NSPM	Nuclear Safety Procedures Manual
NSC	Nuclear Safety Committee
NT	Nuclear Technology
NTS	Noncompliance Tracking System
OHPSC	Operational Health Physics Standards Committee
OPSEC	Operations Security Committee

ORPS	Occurrence Reporting and Processing System
OSS	Office of Safeguards and Security
OTD	Office of the Director
PBCS	Physical, Biological, and Computing Sciences
PCC	Program Coordination Committee
PFS	Plant, Facilities, and Services
PI	Principal Investigator
QAP	Quality Assurance Plan
QAR	Quality Assurance Representative
SELLS	Society for Effective Lessons Learned
SME	Subject Matter Expert
STAC	Science and Technology Advisory Committee
SUF	Scientific User Facilities
TMS	Training Management System
WFO	Work For Others

Executive Summary

This document describes the Argonne National Laboratory (ANL) safety management system (i.e., how environment, safety, and health considerations are integrated into the work planning and conduct) in terms of the six components of Department of Energy (DOE) Policy P450.4, *Safety Management System Policy*. This description meets the requirement of the DOE Acquisition Regulation (DEAR) clause 48 CFR 970.5204-2 as included in the DOE-University of Chicago contract for operation of ANL.

Specific implementation of the five core functions depends on the activity and the risk associated with that activity. At ANL, most hazards are typical of those encountered in offices and general industry; however, there are some additional hazards specific to accelerator facilities (high voltages and radiation hazards), radiological and nuclear facilities (radiation, contamination and accidental criticality), and laser operations. All of these are well understood and controlled. Chemical hazards are typically laboratory-scale and the ANL site has relatively modest environmental hazards.

The basic tenets of ANL's safety management philosophy are defined in ANL *Policy Manual* Chapter 7, *Environment, Safety and Health Protection*. Safety management at ANL has the following characteristics:

- Line managers are directly responsible for the operations under their control.
- Each manager is accountable for ensuring that his/her subordinates understand their respective ES&H responsibilities and are properly equipped and qualified to fulfill these responsibilities.
- Competence is ensured by selective hiring practices that bring qualified personnel to perform jobs. Further, training informs personnel of ANL requirements and controls germane to the assigned tasks.
- While ES&H is always a priority, disciplined processes are used to assist management in evaluating and weighing priorities for environment, safety, and health improvements. Support personnel, subject matter experts, and various Laboratory committees provide assistance to ensure balanced implementation.
- The ANL *ESH Manual* and other Tier 2 manuals define ES&H standards and requirements for identifying, mitigating, and controlling hazards.
- Work is performed with hazard mitigation processes in place; changes in work processes that increase the risk of the work beyond authorized limits require additional reviews and approvals.
- Authorization to initiate work ranges from self-authorization based on job-duty assigned authority to documented DOE approval.
- Implementation of policies and work conduct are self-assessed at ANL.

Argonne National Laboratory

Integrated Safety Management (ISM) Program Description

1.0 Introduction

1.1 Integrated Safety Management System (ISMS)

The Department of Energy (DOE), in response to Recommendation 95-2 by the Defense Nuclear Facilities Safety Board, committed to ensuring that environment, safety, and health are integrated into the management of work throughout its complex. DOE issued Policy 450.4, *Safety Management System Policy*, and Department of Energy Acquisition Regulation (DEAR) clause 48 CFR 970.5204-2, which describes the policy and requirements for this DOE ISMS commitment. The University of Chicago is under contract with the DOE to operate Argonne National Laboratory (ANL) near Lemont, Illinois. The DOE has included DOE P450.4 and DEAR clause 48 CFR 970.5204-2 in the contract with ANL. Therefore, ANL is obligated to comply with DOE P450.4 and DEAR clause 48 CFR 970.5204-2

1.2 Scope and Organization of ISM Program Description

The ISM Program Description describes ANL's Integrated Safety Management System (ISMS), (i.e., how environment, safety, and health considerations are integrated into planning, performing, and evaluating activities at ANL). The description helps to demonstrate that ANL's environment, safety, and health (ES&H) management practices satisfy the six components defined in DOE P450.4. It states ANL's commitment to integrating ES&H considerations into management and work practices at all levels of the organization (Component 1, Objective) and shows the linkage between ANL's policies, processes, and practices and Components 2, Guiding Principles, and 3, Core Functions. The background to build the linkage is described in ANL's Mechanisms (Component 4), Responsibilities (Component 5), and Implementation (Component 6) of Integrated Safety Management. The description also contains the ANL Environmental Management System (EMS) Description Document which describes how operations and processes are monitored and managed to continually improve its environmental stewardship performance (see Attachment A). DOE Order 450.1, *Environmental Protection Program*, requires that the EMS be integrated with the ISMS.

An overview of ANL's commitment to ISM, its organization, and its document structure (Components 1, 4, and 5) are presented in Section 2. Further, Section 2 discusses the vertical and horizontal integration mechanisms in place that ensure a consistent and appropriate application of the safety program throughout the organization. Section 3 discusses application of the Guiding Principals (Component 2) at ANL. Section 4 discusses the Core Functions (Component 3) as they are implemented from the institutional level through the division level to the work activity. Finally, Section 5 provides an overview of the measures taken at ANL to verify that the ISM philosophy has been implemented. In total, the description summarizes ANL's implementation and thus fulfills Component 6.

1.3 Maintenance of ISM Program Description

The Office of Environment, Safety, and Health/Quality Assurance Oversight (EQO) maintains the ISM Program Description so that it documents ANL's current configuration. This description will be reviewed annually and revised to incorporate appropriate changes. Changes may result from reviews, incidents, self-assessments, performance measures, new regulations, program enhancements, etc. The director of EQO may make minor revisions (e.g., wording changes that clarify existing descriptions or revisions to organization names) without further review or approvals. Major revisions will be reviewed by the Environment, Safety, Security and Health (ESSH) Committee and approved by the ANL Laboratory Director. Annual revisions will be forwarded to DOE for approval.

2.0 Mechanisms and Responsibilities at ANL

Argonne National Laboratory is a multi-disciplinary research and development organization that is operated by the University of Chicago under contract for the Department of Energy. ANL applies the available resources (people, funding, facilities, etc.) to achieve its research and development missions. ANL personnel are involved in many programmatic and support tasks: they operate facilities (for support, research, and users), conduct bench-, engineering-, and pilot-scale research, maintain the infrastructure at ANL, perform administrative tasks, conduct information and systems analyses, program and complete research in computer science, conduct and oversee construction, and perform off-site work. Funding largely comes from DOE's Office of Science, although other DOE offices and other entities, both governmental and non-governmental, fund a significant fraction of the research at ANL. Facilities are as varied as the projects conducted at ANL: there are high and low hazards, there are complex and simple operations, there are Category 2 and 3 nuclear facilities and laboratories that conduct research on radiological materials, there are industrial-like facilities (e.g., a steam plant) and unique facilities (e.g., accelerators), and there are facilities that ANL operates for outside users as well as facilities operated solely for ANL support services. A more complete description of the activities conducted at ANL can be found in the Argonne Institutional Plan.

ANL operates under the umbrella of ANL policies that include a firm commitment to implement ES&H requirements that govern the work at ANL. The ANL organization, while encompassing varied programs and goals, provides an effective means of horizontal communication and control. Further, there is a hierarchy of systems within each organization that allows for effective vertical communication and control that remains inter-related with the other organizations. In addition to a clear, hierarchical line organization of people, ANL has an organizational structure for funding, support, and documents. The following sections provide an overview of the organizational structures and mechanisms.

2.1 Commitment to Objective of ISM Policy

The Board of Governors, appointed by the University of Chicago, the ANL Laboratory Directorate, and the ANL Management Council (the Laboratory's senior management body that approves Laboratory policies) are committed to ensuring that ES&H considerations are integrated into the performance of all work. The Board of Governors has prepared the following statement regarding ES&H in the conduct of operations:

"It is the policy of the University of Chicago Board of Governors for Argonne National Laboratory that worker and public safety are given the highest priority in the conduct of Laboratory activities, including the safety of nuclear operations, and the protection of the environment."

The Laboratory's ES&H policy is documented in ANL *Policy Manual* Chapter 7.1, Environment, Safety and Health Policy, and is consistent with the ISM philosophy.

To implement the ES&H policy, the Laboratory Directorate:

- Allocates time and resources to support the ES&H program;
- Supports ES&H training for supervisors and employees;
- Allocates resources for technical ES&H support at all Laboratory levels;
- Analyzes trends of ES&H data; and
- Supports the performance measures and self-assessment processes, which are annual processes to evaluate the effectiveness of the ES&H program and measure its implementation.

2.2 Organizational Structures and Responsibilities

The roles and responsibilities in implementing ISM flow from the DOE to the University of Chicago, to the ANL Laboratory Director and Management Council, to the individual Associate Laboratory Directors and Chief Operations Officer, to the division directors, and to the ANL workers along the line management structure. In addition to the administrative hierarchy of people, there are other structures that help implement the ISM requirements. This section describes the different organizational structures at ANL.

2.2.1 Line Management Organization

The ANL Organization Chart is found in ANL *Policy Manual* Chapter 9, Organization; an abbreviated version is shown in Figure 2-1. The Laboratory Director reports to the University of Chicago's Vice-President for Argonne. The Laboratory Director has a Deputy who can act on behalf of the Laboratory Director when the Laboratory Director is not available.

ANL is divided into three research or programmatic directorates, each headed by an Associate Laboratory Director (ALD) who reports to the Laboratory Director. Although many of the research projects conducted at ANL have basic and applied research components, and several involve the operation of facilities, the three directorates have general specialties for their research. The core competencies for ANL are described in detail in the Argonne Institutional Plan; the focus area for each directorate is summarized here. The ALD for the Scientific User Facilities is responsible for the operation of, and research related to, the Advanced Photon Source (APS) accelerator and the Intense Pulsed Neutron Source (IPNS), and for developing and servicing the APS/IPNS user community. The ALD for Applied Science and Technology (AST) is responsible for applied science and engineering research as well as research in environmental science and technology. The ALD for Physical, Biological, and Computer Sciences (PBCS) is responsible for conducting basic research and operating facilities used in such research (other than the APS/IPNS).

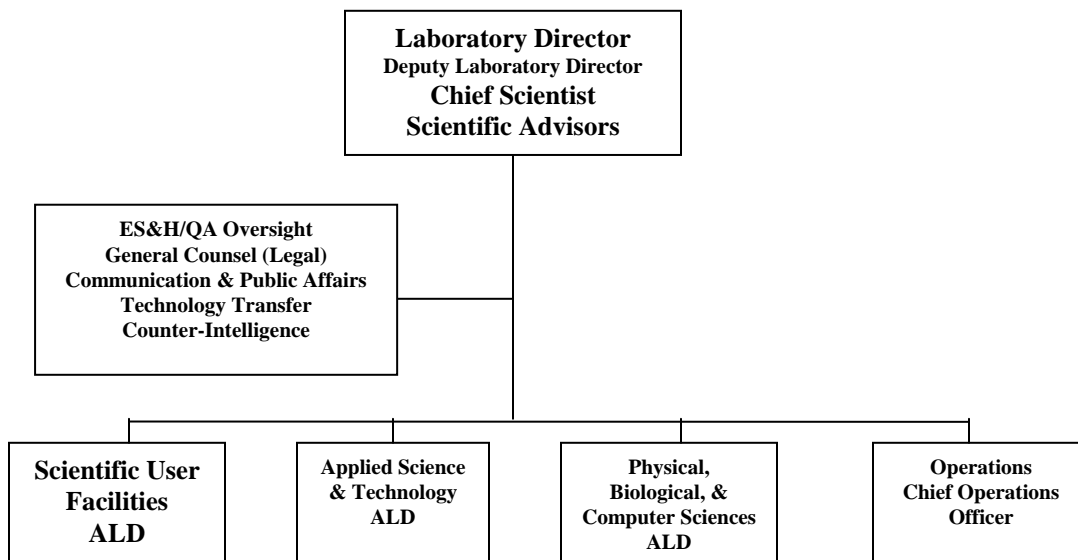


Figure 2-1: Argonne Organizational Structure

ANL has an operations organization headed by the Chief Operations Officer (COO), who reports to the Laboratory Director. The COO is responsible for operating and maintaining the plant and infrastructure at ANL and for providing support to the programmatic directorates in a matrix fashion. The COO also serves as the Price-Anderson Amendments Act (PAAA) Coordinator for ANL and is responsible for reporting non-compliances to DOE that could adversely affect nuclear or radiological safety. The Human Resources (HR) Division reports to the COO for personnel matters. The Chief Financial Officer (CFO) reports to the COO and is responsible for the accounting, budgeting, and procurement operations for ANL.

Each ALD directorate and the COO organization are further divided into Divisions, each headed by a Division Director, that are organized largely by their technical specialties and competencies. Each Division has a hierarchical management and supervisory structure, which may include Associate Division Directors, Department Heads, Program Managers, Section Managers, Group Leaders, Project Managers, Project Supervisors, etc., depending on the Division. The Organization Chart for each Division is documented in the *ANL Policy Manual*.

Other direct reports to the Laboratory Director include the, Deputy Laboratory Director, the Chief Scientist, the Director of Environment, Safety, and Health/Quality Assurance Oversight (EQO), the General Counsel and head of the Legal (LEG) Department, the Director for Internal Audit, the Director for Counterintelligence, the Director for Technology Transfer, the Director for Communications and Public Affairs and support personnel in the Office of the Director (OTD). EQO is responsible for developing the ES&H and QA policies for ANL and for providing oversight on the implementation of those policies. The Director of EQO meets routinely (normally weekly) with the ES&H representatives from DOE/ASO (the local DOE office) to discuss topics related to the implementation of the ES&H/QA programs at ANL. LEG

provides legal counsel and support for patent applications, contract negotiations, performance measure tracking, and ES&H-related regulations.

Line management includes all supervisory personnel in the line from the Laboratory Director to the first-line levels of management (i.e., the first-line supervisors) in each Division. Non-supervisory personnel at ANL report to a supervisor. Many personnel at ANL have collateral duties to serve on committees, serve as emergency response personnel, etc. in the other organizational structures discussed in the next few sections. These other cross-division/cross-ALD/COO structures play an important role in the safe and efficient operations of ANL.

2.2.2 Support Matrix

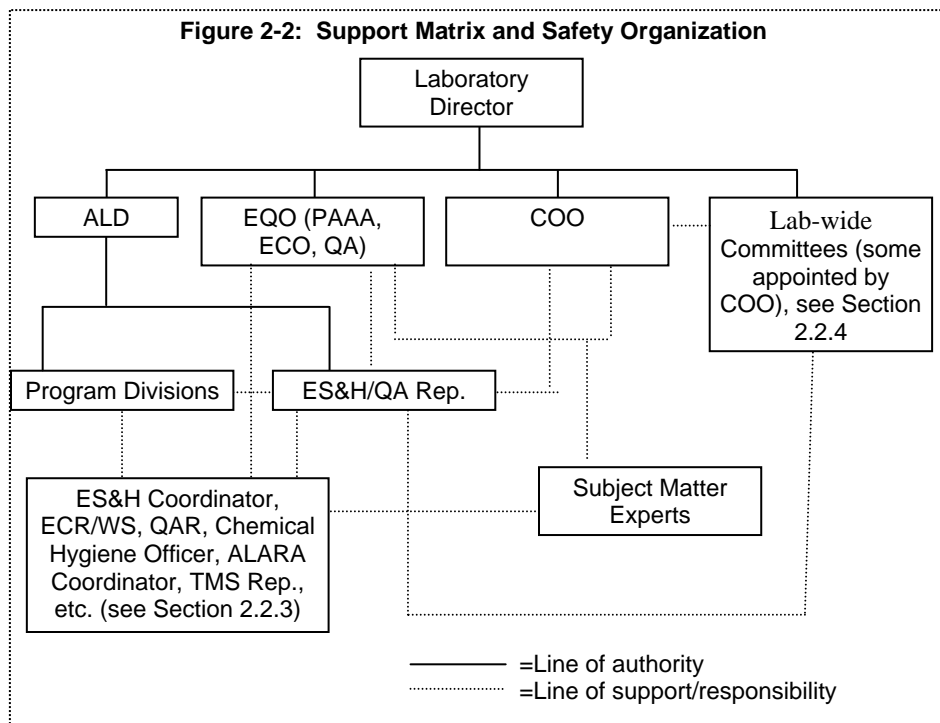
The operations organizations at ANL serve in two distinct roles. First, the organizations carry out the functions at the Laboratory level to keep the site operating. These functions include providing utility services (heat, telecommunications, etc.); maintaining roads; maintaining the grounds; providing for site services (fire protection, emergency preparedness and response, training, etc.); and other services (procurement, human resources, information services, etc.) related to the plant operations and general Laboratory support.

Second, the operations organizations provide support services used by the programmatic organizations, such as medical support, emergency response services, hardware fabrication, etc. The services are either supported by overhead/infrastructure funds or by direct program funds (see Section 2.2.6, below); the service providers are involved in the planning, review, and oversight of activities. Administratively, the employees in these operations organizations report to their respective organizational manager, not the Division Director(s) for whom they provide support.

ANL establishes a set of minimum acceptable standards required in the work performed at the Laboratory; these standards are documented in ANL's policies, processes, and procedures; the documentation system at ANL is described in Section 2.3. For ES&H processes, the ANL ESH Manual documents the program requirements. To assist the line organizations in the implementation of the Laboratory requirements, the Laboratory hires subject matter experts (SMEs) who use their professional judgment, experience and training to guide the line in the specific application of controls to meet the requirements. The majority of SMEs are employed in EQO and Plant, Facilities, and Services (PFS) Divisions, although programmatic Divisions at ANL also hire SMEs because of the activities conducted by the Division, and those SMEs are also used as an information resource for the Laboratory. Because of the variety of work performed and the cutting-edge nature of the research conducted, ANL relies on the SMEs to help interpret new requirements from DOE and other regulators, interpret ANL requirements for a specific project, and provide guidance for a specific project. SMEs often initiate policy changes and are a major source of support to EQO in policy development. For functional ES&H areas, EQO maintains a list of SMEs on their web page and provides a list of knowledgeable points of contact for each section of the ANL ESH Manual in Section 1.1, Appendix C.

A simplified schematic overview of the support matrix and safety organization (described in Sections 2.2.3 and 2.2.4) at ANL is shown in Figure 2-2. The solid lines show the lines of authority (i.e., administrative reporting), while the dotted lines show the various interfaces that exist. SMEs support EQO, lab-wide safety committees, ALD ES&H/QA Representatives, etc.

The support organizations and specifically the SMEs assist and consult each other and share lessons learned. EQO assesses the implementation of ANL's ES&H and QA policies and provides another mechanism for disseminating good practices and lessons learned among the Divisions.



2.2.3 Safety Structure in Line Organizations

Because the line organization is responsible for planning and conducting their work in accordance with ISM, the line organization has an ES&H structure (left side of Figure 2-2) that is the primary link between the programmatic work completed in the research directorates and the support services and expertise offered by the SMEs and the operations organizations. As necessary, the line organization requests assistance from the SMEs and operations organizations. In addition, the line organization performs oversight at the research directorate-, division- or facility-level and provides feedback to EQO, the SMEs, and the lab-wide committees. The following paragraphs discuss specific positions in the line ES&H structure.

Each ALD and the COO have an ES&H/QA Representative. The ES&H/QA Representatives ensure implementation of the Lab's ES&H and QA policies and requirements in their Directorate. They work with the ALD/COO and Division Directors to help ensure that the level of resources available for ES&H and QA is consistent with the risk for the work being conducted. The ESH/QA Representatives also interact and share ES&H information and lessons learned, through both formal and informal communication, as well as provide support for lab-wide initiatives and problem resolution. As necessary, the ES&H/QA Representative facilitates contact between their programmatic organizations and the appropriate support organizations.. The ES&H/QA Representatives normally serve as the National Environmental Policy Act

(NEPA) owners for their organizations, although the function may be assigned to another individual. The NEPA owners are responsible for ensuring that work within their organizations is appropriately documented and approved in accordance with the requirements of NEPA. Finally, the ES&H/QA Representative often serves as the point of contact for ORPS reports. (See also Figure 2.2 ANL Environmental Organization, in the EMS description document.)

There are several functional positions, or functionaries, within each Division that coordinate self-assessment and surveillance activities. They interact with their counterparts throughout the Laboratory. Further, these functionaries are typically involved in the planning and review of activities within a Division. Many of these positions are collateral duties, and in a specific division, one individual may serve in several capacities. The general responsibilities are documented in the lab-wide manuals and documents (see Section 2.3); Division-specific responsibilities are determined by the Division and are documented in the Division's Quality Assurance Plan (QAP) and other division-specific documentation. The Division's ES&H organization is generally described in the Division's Safety Charter or equivalent.

The Division ES&H Coordinators concentrate on general ES&H topics and have knowledge of ES&H requirements and their application to the work conducted within the Division. Typically, the ES&H Coordinator is the point of contact between the Division and the SME in the service divisions. They also help disseminate lessons learned within the Division and to other ANL organizations. The Division environmental compliance representative (ECR) is responsible for issues specifically related to environmental concerns, such as releases, waste management, NEPA documentation, environmental permits, etc. The quality assurance representative (QAR) is generally responsible for assisting in the implementation of the Division's QAP. To promote the sharing of lessons learned and good practices and to serve as a forum for disseminating appropriate information across the Divisions, routinely scheduled QAR, ECR, and ES&H Coordinator meetings are held.

Those Divisions that conduct work with large radiological concerns have an As Low As Reasonably Achievable (ALARA) Coordinator who is responsible for establishing the Division's ALARA goals (total Division exposure, maximum individual exposure, etc.). Those Divisions that handle significant quantities of fissionable material have a Criticality Safety Representative (CSR) who reviews the documentation related to criticality safety and oversees its implementation. Those Divisions that are the contracting organization for a service contract with an external vendor/provider have a Technical Representative for the service contract. Similarly for construction activities, a Construction Field Representative is appointed.

The Division Training Management System (TMS) Representative is responsible for tracking the training status of Division personnel. Other Division assignments include functionaries such as a Computer Protection Representative, an HR Representative, a Division Property Representative, a Division procurement administrator, a Building Manager, an Area Emergency Supervisor, a Chemical Hygiene Officer, Lock-out/Tag-out Custodians, Sealed Source Custodians, etc. Each of these people plays a role in how work is conducted within the Division and may also provide an important operational assurance function; typically, these functional responsibilities are met on a collateral basis. The responsibilities for each function are specified in ANL documents, discussed in Section 2.3. The organizational structure of a specific division can be found in the ANL *Policy Manual* and is usually discussed in the Division's QAP.

2.2.4 Committees

Identification, implementation and conformance with regulations/requirements are also assisted through lab-wide and division-level committees. The members of the committees come from various ANL organizations, and the representation allows for development of policies that are appropriate for ANL hazards and organizational structure, and can be applied across the diverse ANL organizations. Committees discussed in this section are standing committees (names given in bold face), although ad hoc committees are also formed, as is appropriate, for specific tasks. The standing committees recommend policies, interpret requirements in certain areas, and review designs, plans, and work. The purpose and membership for all standing committees is described in detail in the Laboratory Committees Manual and in the committee's charter. The following list summarizes the role of some of the committees at ANL.

- The **Management Council** is the primary policy-setting body for the Laboratory and is a standing committee composed of the Laboratory's senior management including the Laboratory Director, the Deputy Laboratory Director, the ALDs, the COO, the EQO Director, the CFO, the General Counsel, and the HR Director. The Director of the Office of Public Affairs and the University of Chicago's Executive Director and Deputy to the Vice President for ANL also attend the meetings, which are held weekly. Through this forum, senior management at Argonne is informed of ES&H, QA, and other issues related to operating the Laboratory.
- The **Environment, Safety, Security, & Health (ESSH) Committee** is composed of the Director EQO as chair, the Deputy Laboratory Director, the Associate Lab Directors, and the Chief Operations Officer. The ESSH Committee meets as necessary and is the highest level ANL forum for driving environment, safety, security, and health performance, improvements, and accountability. Annually the ESSH Committee also meets with or receives reports from each of the other Laboratory safety committee chairs to learn about any issues in his/her specific area. Specifically this committee reviews and approves the ESH&I Management Plan and acts as the final authority in disputes to major additions to or revisions of Tier 1 and Tier 2 documents relative to environment, safety, security, and health
- The **Nuclear Safety Committee (NSC)** reviews documentation (e.g., safety analysis reports) related to the safe operations of ANL's nuclear facilities, performs facility reviews, provides feedback to the nuclear facilities, and provides recommendations to the Laboratory Director. The Laboratory Director appoints members of the NSC. The functions of NSC are discussed in the Nuclear Safety Procedures Manual (NSPM).
- The **Accelerator Safety Review Committee (ASRC)** reviews documentation related to the safe operations of ANL's accelerator facilities, provides feedback to the accelerator facilities, and provides recommendations to the Laboratory Director, who appoints members to the ASRC. The functions of the committee are discussed in the Accelerator Safety Procedures Manual (ASPM).
- The **ANL Operational Health Physics Coordination Committee (OHPCC)** serves as a forum for sharing ideas, developing internal procedures and processes, and supporting the radiological program. The committee is chaired by the ANL Radiological Safety Officer (RSO). The OHPCC meets as required, but no less than quarterly.
- The **ALARA committee** establishes ALARA goals, reviews significant changes to documents related to radiological work, and reviews specific projects that present high radiological risks.

For ANL, the Division ALARA Coordinators, the Division Health Physicists (non-voting members), and the Laboratory ALARA Coordinator and the Laboratory Radiation Safety Officer are members of the committee, which meets quarterly or more frequently as necessary. The functions of the ALARA committee are described in the ANL *ESH Manual*, Chapters 5-21 and 5-22.

- **The PAAA Committee** is appointed by and reports to the PAAA coordinator and assists in the identification of issues that are potential PAAA noncompliances. If a PAAA noncompliance exists, the PAAA Committee determines its level of severity and provides a recommendation to the PAAA coordinator.
- The **ES&H/QA Oversight Coordinating Committee** consists of all the ALD/COO ES&H/QA Representatives and the EQO Director. A representative from LEG is also invited to the meetings. The meetings are held as required and serve as a forum for disseminating ES&H/QA information and for sharing information, good practices, and lessons learned identified in the different research directorates or the operations organizations.
- There are many other standing committees that support the laboratory operations. These include the Electrical Safety Committee, the Pressure Technology and Safety Committee, the Emergency Preparedness Review Committee, the Transportation Safety Committee, the Operations Security Committee (OPSEC), the Traffic Safety Committee, the Land Management and Habitat Restoration Advisory Committee, the Waste Minimization and Pollution Prevention Committee, and the National Security Oversight Committee. The standing committees mentioned in this section, as well as others that support the Laboratory operations, are described in more detail in the Laboratory Committees Manual. (See also the environmental related committees in section 2.2.2.3 of the EMS description document.)

2.2.5 Building, Facility, and Laboratory Management

The Laboratory's resources include the buildings and the facilities, laboratories, offices, conference rooms, and common areas within those buildings. These resources are described separately because some of the support functions are related to the structures and they cross division lines.

A Building Manager is appointed for each building and is responsible for coordinating the interface between programmatic and maintenance activities in the building (Ref. ANL *Policy Manual* Chapter 11 Part 11.2, *Operation and Maintenance of ANL Buildings and Facilities*). The Building Manager/Facility Manager is generally an employee of the major occupant of the building; if the building is jointly occupied, the Building Manager/Facility Manager represents all the organizations in the building.

As part of the emergency response organization, each ANL building with more than ten occupants has an Area Emergency Supervisor (AES) who maintains an awareness of conditions within the building and helps to ensure that emergencies are reported properly to the Fire Department alarm office. The AES also maintains the Emergency Plan for the ANL buildings. The role of the AES is described in detail in the ANL Comprehensive Emergency Management Plan (CEMP).

Laboratories and office spaces are assigned to a line organization, and a point of contact is identified for each space. The operations within the spaces are the responsibility of that line

organization, and the supply of utilities and services to the spaces (e.g., electricity, janitorial services, etc.) are the responsibility of PFS; PFS is also responsible for the upkeep of the common areas. Many laboratories have an assigned supervisor who serves as the emergency contact and may also be involved in the review of activities planned for the laboratory.

ANL operates nuclear (Category 2 and 3) and accelerator facilities; a complete list of the facilities is found in the NSPM and ASPM, respectively. Each of these nuclear and accelerator facilities has a Facility Manager who is the primary point of contact for the facility. At ANL, the facilities are part of a building and therefore have both a Facility Manager, who is responsible for the specific activities related to the facility, and a Building Manager, who is responsible for the overall activities in the building. A facility may also have personnel with functional responsibilities such as those described in 2.2.3 (e.g., a facility Criticality Safety Representative or facility ALARA Coordinator) assigned for the facility.

2.2.6 Funding Structure

Funding for activities at ANL comes from various sources and through various paths; ANL receives funding to conduct research; operate facilities; conduct environment restoration projects, including decontamination and decommissioning (D&D) activities; and perform infrastructure maintenance and upgrades. Sponsors provide support for individual programs and project and facility operations; the funding does not necessarily flow down through the line organization that was discussed in Section 2.2.1. However, independent of the source of the funding, the Laboratory policies and processes apply because they are institutionalized. The Laboratory, Associate Laboratory Directorates, and Divisions tax the funding to support the common operations at the various organizational levels. This section gives an overview of the funding because it relates to planning for and authorization of the diverse range of ANL activities.

Research Funding

ANL's research missions are determined by its core competencies and the needs of the stakeholders (DOE, University of Chicago, other funding agencies, and ANL researchers). DOE provides program direction from the Offices of Science (DOE-SC), Environmental Management (DOE-EM), Nuclear Energy (DOE-NE), Energy Efficiency and Renewable Energy (DOE-EE) and other DOE offices as well as other funding agencies through the DOE contracting officer related to program intent and objectives, budget authorization, and applied constraints. Based on communications between ANL and the sponsoring organizations, ANL prepares an institutional strategic plan that lays out the long-term strategy for the Laboratory. The Institutional Plan concentrates mainly on the research needs but also addresses environment, safety, and health, quality assurance, infrastructure, and human resource program needs. The Institutional Plan is reviewed by DOE and the ANL Strategic Planning Council (the Laboratory Director, the Deputy Laboratory Director, the Chief Scientist, and the ALDs/COO), and serves as the basis for the long-range work planning by ALDs and their respective divisions.

For each major funded program, ANL has an identified Program Manager who serves as the point of contact for the Laboratory. In this capacity, the Program Manager may be involved with more than one ALD. The Program Manager collects the proposals from the various Principal Investigators involved with the program, and reviews the proposals and documentation from the program perspective, independent of the specific Division that is conducting the work. The

Program Manager submits the proposals to DOE. The Program Manager typically has no direct line responsibility for the people conducting the work for the program; the workers report through their respective Division Directors and are provided to the program via a matrix arrangement. For smaller programs where coordination of several projects is less of a concern, a Section/Group leader or Principal Investigator (PI) acts in a similar capacity to the Program Manager as the point of contact for the program.

DOE funds approximately 85% of the work conducted at ANL; Work For Others (WFO) funds the balance. For the DOE-funded work, a Field Work Proposal (FWP) is the main document used to request funding for a research program. Based on the funding available through the appropriations bills (for ANL funding from DOE, Energy and Water provides about 90% and Interior typically provides the balance), money is allocated to programs and transmitted to ANL as “funded” proposals. The majority of programs at ANL are funded through DOE-SC, the landlord for ANL. WFO funds are provided from other government agencies and commercial entities. The scope of work and the funding needs are documented by a FWP, a contract, or other method as required by the funding agency and DOE requirements.

Indirect Funding

Because the direct funds from DOE and WFO are for specific programs, ANL has an indirect rate structure that assesses the direct-funded programs to pay for operating expenses and support functions. Each of the support Divisions prepares a budget request based on the anticipated needs of the Laboratory. An internal review committee and staff from the Budget Management Office, reviews the proposed indirect budget. The Directorate approves the indirect budget.

Indirect expense is assessed to programs at the Laboratory through a rate structure based on recovery of indirect costs in individual areas or pools. Those pools and associated rates are the General and Administrative Pool, which covers OTD, the COO’s office and administrative support (e.g., secretarial, etc.), Internal Audit, the Legal Department, and the CFO organization (except for Procurement and portions of the Accounts Payable covered as noted below). The Common Support Pool covers most of the COO Divisions (e.g., HR, Public Affairs, etc.), site development projects, site support projects, and other Laboratory general and discretionary expenses, including LDRD. It also covers EQO and the safety subject matter experts within that group and can be a source of funding for ES&H needs that are not covered at the division level or through capital funding. The Materials and Subcontracts Pool covers Procurement, portions of Accounts Payable, Shipping, Receiving, Stores, and Materials Ordering System.

Funds are released either to operations directly or to the Divisions on a Work Project Authorization form for project costs. Assessment at the Division or Program level covers the overhead expenses including the management of the programmatic divisions and to correct smaller cost ES&H concerns that are immediate or can easily be handled at that level. The Division overhead also covers the cost of Laboratory support functions under direct allocations, although there are situations in which the direct allocations are charged to a specific cost-code (i.e., an FWP program). These functions include Building Maintenance, Utilities, Custodial Services, Special Materials, and the Information and Publishing Division (IPD) services.

Funding for ES&H and Infrastructure (ESH&I) Needs

DOE provides additional capital funding to address some ES&H and infrastructure needs at ANL. This latter funding comes as general plant projects (GPP), general plant and equipment (GPE), multi-program energy laboratory facilities support (MELFS), and construction (or line

item) funds. Major upgrades (e.g., fire protection upgrades) or other projects (e.g., Environmental Restoration Projects such as Remedial Action Projects and Decontamination and Decommissioning Projects) are typically planned and proposed as line items or under DOE baseline funding; smaller construction projects are typically funded by GPP. GPE is used for equipment to be used on a lab-wide basis (e.g., a new fire engine); programmatic equipment is typically requested as part of the FWP. These funds for equipment are assessed to cover a portion of the ANL indirect expenses, as well.

Facility and safety deficiencies are identified by various means including safety walkthroughs by line management, maintenance issues noted by PFS, items noted and reported by line staff. Those deficiencies of immediate concern are addressed by line management using operating and/or capital funds. Those not immediately corrected as part of normal operations are documented and tracked in the EQO tracking system (EQO has provided the divisions with a deficiency tracking tool called Sharepoint which is available for their use in tracking and trending) or in their own division system. Line management is responsible for taking care of the deficiencies using a graded approach based on risk and in noting the corrective actions and in having the deficiency removed from the list when corrected.

For those deficiencies requiring significant funding, line management will list the facility needs and deficiencies as part of the ESH&I prioritization process. The needs are integrated into a single list and prioritized independent of the potential funding source. The prioritization is made by the process stakeholders including representatives from each ALD office, PFS, and EQO; DOE-ASO also participates in the planning review sessions. Available funds are allocated for the projects based on the prioritization and consistent with DOE requirements. The list is included as part of the ANL *Environment, Safety, and Health and Infrastructure (ESH&I) Management Plan*. The list is approved by the ESS&H Committee and forwarded to DOE. During the year as unanticipated needs are identified, the COO may reallocate funding to address pressing issues.

2.3 Policies, Processes and Requirement Documentation

This section describes the documentation hierarchy at ANL and the flow-down of the requirements from regulators through the Prime Contract to the employees.

2.3.1 Document Hierarchy

The Laboratory documentation is separated into three tiers; the top tier documents the policies, the second tier further defines the policies and provides lab-wide processes and procedures to implement the policies, and the third tier includes the division-specific policies, processes, and procedures, and records, permits, and other activity-specific documents that exist below the umbrella defined by the Tier 2 documents. The *ANL Policy Manual* is the laboratory's Tier 1 policy document (<http://www.aim.anl.gov/manuals/policy/index.html>) and chapter 2 of that document lists the Laboratory controlled documents in Tier 2. Table 2-1 provides some examples of the Tier 3 and below document listings and will vary depending on the Division and activity.

Table 2-1: Tier 3 and Other Documents

ANL Tier 3 and Other	Implementing Requirement
Division Quality Assurance Plan	QAPP
Division Management Plan	
Safety Charter	ESH Manual
Chemical Hygiene Plan	ESH Manual
Building Emergency Plan	CEMP
Position descriptions	HR Manual
Other division-specific policies and procedures	
Inventories of materials, equipment, and facilities per ANL requirements	ESH Manual
Division/Facility/Project Level Documentation	Implementing
(Mix of documents and records that are used below the Tier 3 umbrella)	Requirement
Experiment Safety Reviews	ESH Manual
NEPA Submittals	ESH Manual
Assessment Reports	QAPP
Incident Reports	ESH Manual
Training Records	ESH Manual
Safety Analysis Reports/Technical Safety Requirements/Operational Safety Requirements/Basis for Interim Operations	NSPM
Criticality Safety Evaluations/Criticality Hazard Control Statements	NSPM
Safety Analysis Documents/Accelerator Safety Envelopes	ASPM
Work plans (e.g., FWP, Statement of Work, proposal, CRADA)	
Design specifications, plans, drawings, and approvals	QAPP
Operating procedures (as needed to adequately assure safety and quality)	QAPP,ES&H Manual
Quality assurance plans (as needed to supplement division plan)	QAPP
Specific Work permits (Safe Work, RWPs, hot work, digging, open flame, etc.)	ESH Manual
Fire Department Building Preplans	
Other ANL Manuals and Handbooks	
DD/DH Business Communication Archive	COO
Form Locator and Repository	IPD

The *ANL Policy Manual* describes the overall policies of the Laboratory. The ES&H, HR, Construction, Health & Safety, Transportation of Hazardous Materials, Property Management, and QA policies are documented in the *Policy Manual*. Other chapters provide base Laboratory policy for specific types of work. The references to the individual Policies are noted throughout this ISM Program Description. The *Policy Manual* also describes the organizational structure and the roles and responsibilities for the line management positions. The COO maintains the ANL *Policy Manual*, although the contents are subject to review and approval by the Management Council.

The Tier 2 documents and manuals further refine the Tier 1 policies and establish processes, procedures and specific requirements for implementing the policies. These documents tailor the general requirements of DOE Orders and national ES&H standards to the nature and complexity of the work and associated hazards at ANL. The Tier 2 documents are prepared by Laboratory organizations with primary responsibility for the subject area covered. The majority of specific requirements related to ES&H and the processes for implementing the requirements are given in the ANL ES&H Manual and the QAPP. Hazard topics covered by the site manuals include, for example, hazardous materials (chemicals, asbestos, carcinogens, alkali metals, hydrogen, infectious biological agents, cryogens, and explosives), ionizing and non-ionizing radiation, work space hazards (confined spaces, noise, housekeeping and sanitation, ventilation, tool usage, and watercraft safety), electrical hazards, fire hazards, use of personal protective equipment, pressure hazards, firearms, and traffic safety.

Tier 3 documents further refine the general processes defined in the Tier 2 documents to the specific hazards and activities in the Division. Table 2-1 identifies many of the Tier 3 documents and other documents that are required by the Tier 2 documents. (Additional examples of tiered documents may be found in Section 2.3.1 of the EMS description document.)

2.3.2 Vertical Integration of Requirements and Feedback

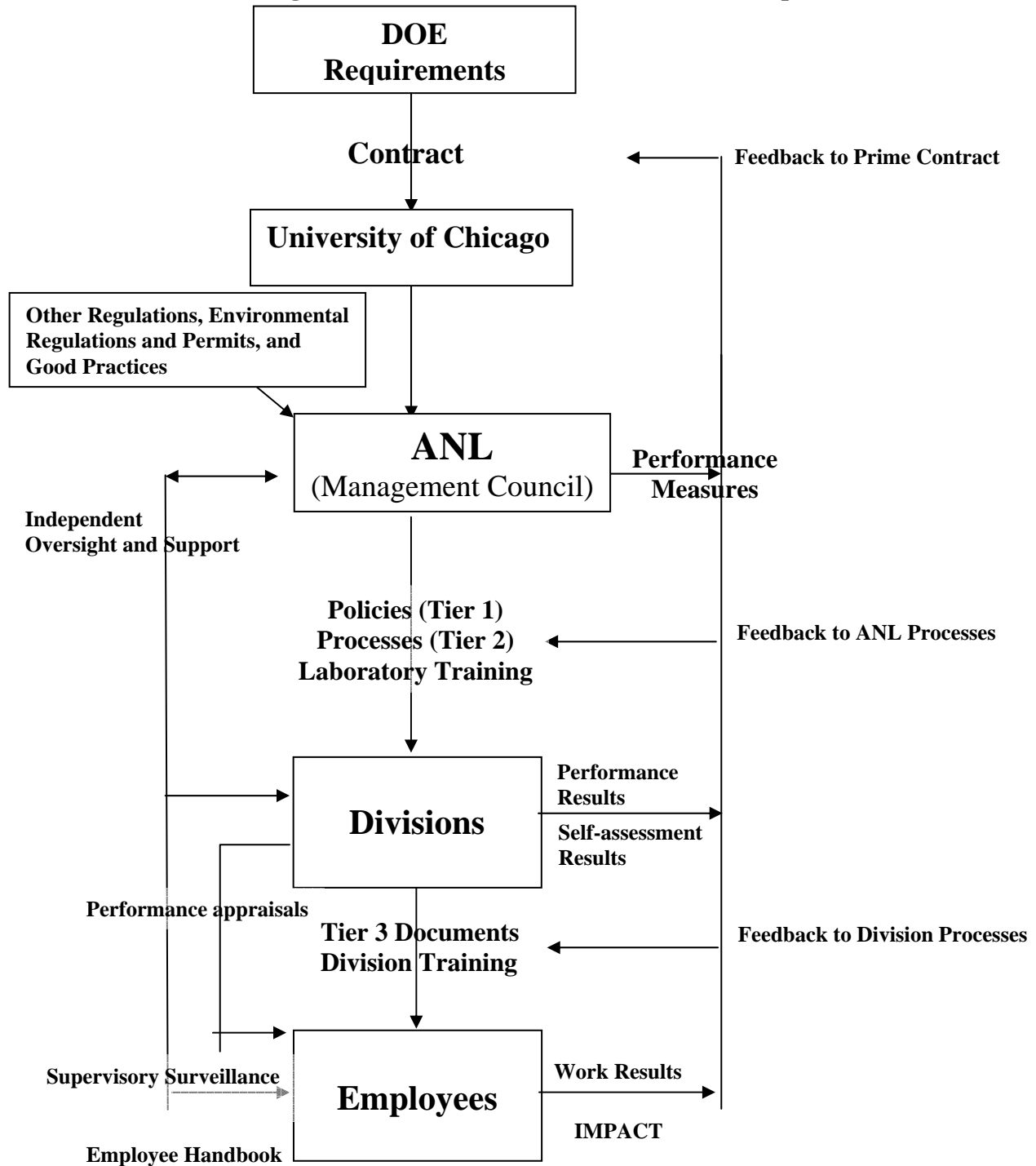
Figure 2-3 summarizes the dissemination of requirements and feedback between DOE and ANL employees (center of Figure 2-3). DOE provides direction through the University of Chicago Contract, which provides a listing of the DOE Orders/requirements (Appendix I). Performance Measures that measure the implementation of the contract are annually determined between ANL/University of Chicago and the DOE. The requirements are codified in a Tier 1 policy and Tier 2 document. Requirements external to DOE are also covered in the Tier 2 documents and in the environmental permit documents. The Tier 1 and Tier 2 documents provide those policies and requirements used as the basis for training provided to employees and others conducting work at ANL. Requirements are also given directly to employees in the Employee Handbook, which is a condensation of the *ANL Policy Manual* and those implementing processes germane to the employee.

Based on the Tier 1 and Tier 2 requirements, Divisions establish division-specific requirements (Tier 3) and training. Other mechanisms used to flow-down laboratory requirements include job planning meetings, pre-job briefings, site specific hazard assessments, design and operating reviews, specific work requests, supervisory oversight, safety meetings, performance appraisals, and training.

Figure 2-3 also shows other mechanisms used at ANL to flow-down requirements, measure implementation of the requirements, and receive feedback from all levels of ANL. On the left side of Fig. 2-3, "Independent Oversight and Support," including EQO, and lab-wide safety committees, interacts with Divisions and Facilities and further reinforces ANL requirements. Such interactions also lead to valuable feedback from the various ANL organizations.

The right side of Figure 2-3 illustrates how feedback is received and input to refine the various mechanisms (documents, procedures, etc.). Feedback comes, for example, from the following: at the employee level -- work results, safety meetings, informal meetings with peers and supervisors, e-mails, performance appraisals, quality and safety recognition programs, Health and Safety Plan reviews, divisions suggestion programs, and the Impact program; at the Division level -- self-assessment, inspections, safety reviews, independent assessments, visits to other institutions, and incidents; at the institutional level -- performance measures, functional and self-assessments, and incident investigations. The feedback is used to revise the different tiers of documents, the training or other mechanisms at the Laboratory, and to generally accomplish improvements of safety programs and their implementation. (See also Figure 4.2 and section 2.3.3 – 2.3.4 of the EMS description document.)

Figure 2-3: ISM Vertical Flow-down Roadmap



2.3.3 Incorporation of New Requirements

ANL *Policy Manual* Chapter 6, Section 6.18, *DOE Directives Processing System*, defines the procedure for processing draft and final DOE Orders or other directives and incorporating them into the documentation hierarchy. As new or revised DOE Orders/requirements are provided to the Laboratory, OTD logs them in. OTD then assigns responsibility to a functional lead to coordinate an evaluation of the directive and its impact on established Laboratory policies, requirements, and funding and distributes the directive to the functional lead. The functional lead is defined in the ANL *Policy Manual* Chapter 6.18 and varies depending on the directive subject matter. An evaluation is conducted, including input from appropriate programmatic, safety, security, and administrative staff. The evaluation will result in the preparation of a response to DOE, which will include, as appropriate, an implementation plan for changes to Laboratory programs and documents, safety performance objectives, funding needs, and performance measures or commitments. The response is provided to the Chief Operations Office (COO) for final review, signature, and transmittal to DOE. For ES&H directives, EQO is the functional lead that coordinates the response. The COO is responsible for informing the Laboratory Director of changes to DOE directives that have potential major impacts on the Laboratory. New ANL *ESH Manual* requirements are prepared by an appropriate SME, reviewed by line management for input, approved by EQO, and depending on the nature of the requirement may require approval by the ESSH Committee.

Changes to topical manuals such as the *Transportation Safety Manual* or the *QAPP* are prepared by an appropriate SME and then reviewed by broad-based committees of subject matter experts and representatives of the organizational units affected by the changes.

In addition to new or revised DOE Orders and regulations, which prescribe requirements, ANL uses other sources to identify opportunities for improvement. These include lessons-learned reports, interactions with other DOE sites, participation in informal/formal forums (e.g., topical conferences), ORPS and NTS reports, assessments by stakeholders, and others. The ANL EQO Environmental Planning and Compliance group subscribes to the codes of state and federal regulations, and as new regulations come out, they are reviewed to ensure ANL programs still meet the regulations in all the environmental areas. This group also receives numerous environmental publications and attends environmental conferences and meetings where impending or expected changes to requirements are discussed. If new regulations require changes to environmental permits, these are made with the state at the time the existing permit is up for renewal. All feedback mechanisms are used to improve the documentation of requirements.

2.4 Horizontal ISM Integration

The structures and documentation described in the previous two sections provide checks and balances to ensure the appropriate requirements are implemented at all levels of the Laboratory. The flow-down allows for implementation of the requirements to the specific hazards and activities and thus naturally leads to different approaches in different Divisions. Because of this, the support and oversight organizations (including EQO, the committees, the SMEs, and the line ES&H structure discussed in Section 2.2) play a pivotal role in ensuring a consistent application of controls and analyses for similar hazards and activities across the Laboratory. In other words, the organizations and mechanisms discussed above promote horizontal integration among diverse organizations. ANL Policies, Tier 2 documents, and the requirement for certain Tier 3

documents provide the integrating forces, and EQO assessments and oversight measure the results.

The mechanisms of feedback used to promote horizontal integration, including those provided by DOE and the University of Chicago, are summarized in Table 2-2. The first column gives the organization level, the second column identifies the specific mechanism used by a given organization level, and the third column provides comments that explain the outcomes or results of the mechanisms in the second column. The results are used by EQO and other ANL organizations to continually improve the ANL policies, processes and other mechanisms (the feedback process is discussed in more detail in Section 4.0). (See also section 2.4 of the EMS description document)

Table 2-2: Horizontal Integration of ISM

ORGANIZATION LEVEL	MECHANISM	RESULTS
DOE	Coordinate meetings and publish lessons learned materials	DOE labs share lessons learned, opportunities for improvement, etc.
	Site visits	An exchange of ES&H ideas and discussions of programs across the DOE complex are held.
	Perform reviews	Both HQ and local DOE staff conduct program and functional safety reviews across the site.
	Perform walkthroughs	DOE facility representatives perform walkthroughs of facilities across the site and provide feedback on findings.
	Accident/incident investigations	Teams composed of DOE and/or other lab personnel from DOE locations share their knowledge and expertise.
University of Chicago	Scientific and Technical Advisory Committees (STAC) reviews	Independent reviews of the programmatic Divisions are conducted.
	Environment, Safety, and Health Committee reviews	ES&H status of the Laboratory is reviewed.
ANL Institutional	ANL Safety Committees reviews	Committees reporting to the Lab Director/COO provide feedback on specific topics.
	Facility walkthroughs	Senior management (Lab Director, ALDs, Division Directors, and EQO) performs walkthroughs of laboratories and facilities.
	Management Council reviews	In weekly meetings, lab-wide issues including those related to ES&H are discussed.
	EQO reviews for the lab director	Reviews of functional safety areas across the divisions help to assure consistency with lab requirements.
	ECR meetings	Meetings to discuss environmental concerns and lessons learned.
	QAR meetings	Meetings to discuss QA concerns and lessons learned.
	ES&H/QA Coordinating Committee meetings	ALD/COO ES&H/QA Representatives meet with EQO to share lessons, plan safety strategy, and exchange ideas.

ORGANIZATION LEVEL	MECHANISM	RESULTS
ANL Institutional (cont.)	ES&H Coordinator meetings	Meetings to discuss ES&H concerns and lessons learned.
ALD and Division Level	Division Management facility walkthroughs	Division management performs walkthroughs of its operations.
	Accidents/investigations	Investigations of specific occurrences result in lessons that are shared throughout the Laboratory, as appropriate.
	Division Director meetings	ALDs and Division Directors hold routine staff meetings in which ES&H issues are discussed.
	Self Assessments	Divisions conduct self-assessments, coordinated by EQO, that measure implementation of ANL requirements.
	Independent Assessments	Divisions arrange for independent assessments of ESH/QA processes/programs to obtain feedback to continuously improve operations.
	Site Visits to Other Institutions	Good practices observed at other institutions are evaluated for implementation by ANL and /or the division.
Employees	Participation on Lab Committees	Lab employees are rotated on committees and learn from their peers and ES&H integration
	Stop work policy	Lab employees all have stop work authority without fear of reprisal.
	Accident/incident investigations	Lab employees participate on investigations and learn and share information.
	“Toolbox” (i.e., job location) safety meetings	Many groups hold daily pre-work safety meetings to exchange ideas and safety concerns.
	ANL newsletters/reporting mechanisms	Argonne News, memos, Safety Awards, and e-mails provide ES&H information to employees

3.0 Guiding Principles

For each of the guiding principles in the ISM policy, the sections below provide the principle statement (in italics) and a short discussion of the mechanisms at ANL used for implementation.

3.1 Line Management Responsible for Safety

Line management is directly responsible for the protection of the public, the workers, and the environment.

In accordance with ANL Policy on Health, Safety, and Environmental Protection (Chapter 7 of the *ANL Policy Manual*), line management is responsible for ensuring the safety of ANL activities (including construction), for implementing ANL safety requirements, and for providing for a healthy and safe workplace. The lines of responsibility follow the lines of authority discussed in Section 2.2.1; the Laboratory Director is responsible overall for the implementation of the ES&H Policy at ANL.

In addition, all individuals who perform work at ANL have the authority and responsibility to “stop the work” when they observe or are involved in an unsafe activity or working conditions. The responsibility for integrating ES&H considerations and stopping unsafe work extends to contractors, guest researchers, facility users, students, and visitors.

Other specific *ANL Policy Manual* sections that discuss the responsibility of line management for implementation of ES&H aspects include Chapter 4 Part 4.1, *Construction Project Management*; Chapter 6 Parts 6.5, *Preparation, Submission, and Approval of Work-for-Others Proposals*; Chapter 8, *Human Resources*; Chapter 11 Part 11.2, *Operation and Maintenance of ANL Buildings and Facilities*; and Chapter 12, *Quality Assurance*. The ESH Manual Chapter 1-1 summarizes the ES&H program and Chapter 10-1 provides a description of the environmental protection program; both clearly state that line management is directly responsible for the implementation of the programs.

3.2 Clear Roles and Responsibilities

Clear and unambiguous lines of authority and responsibility for ensuring safety shall be established and maintained at all organizational levels within the Department and its contractors.

The lines of authority and responsibility for work are clearly defined by the ANL organizational structure, which was summarized in Section 2.2.1. *ANL Policy Manual*; Chapter 7, *Health, Safety, and Environmental Protection*, specifies the specific roles related to ES&H. Specific responsibilities are documented in the Tier 2 and Tier 3 documents discussed in Section 2.3.

Other specific *ANL Policy Manual* sections that define roles and responsibilities for implementing ES&H aspects include Chapter 4 Part 4.1, *Construction Project Management*; Chapter 6 Parts 6.5, *Preparation, Submission, and Approval of Work-for-Others Proposals*; Chapter 8, *Human Resources*; Chapter 11 Part 11.2, *Operation and Maintenance of ANL Buildings and Facilities*; and Chapter 12, *Quality Assurance*. The ESH Manual Chapters 1-1 and 10-1 define the basic assignment of ES&H roles and responsibilities.

3.3 Competence Commensurate with Responsibility

Personnel shall possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities.

Assuring competence at ANL is the goal of the hiring process that is administered by HR. It begins with the selection process for an individual position. A position description is prepared and an individual is hired to satisfy the requirements of the position description. Safety requirements are also stated in the position description. Once in the position, a Job Hazard Questionnaire (JHQ) (ref. *ESH Manual* Chapter 1-5) is completed by the supervisor and the employee. These identify hazards and work relationships that may require knowledge of specific hazards and hazard controls. The JHQ is used in conjunction with the Training Management System (TMS) by EQO-Training to assist management in matching the required training to the individual's job-related hazards and confirming that the individuals doing the work are properly trained to safely perform work. The format and implementation of the position description and JHQ processes are described as part of the ANL Human Resources process. The TMS also provides a record of training required and the training completion status of each requirement for every Laboratory employee. A "Physical/Function Requirements/Work Environment Form" is also maintained for employees as a basis for management expectations of job requirements and recognized employee limitations; and is maintained as part of the JHQ.

Divisions, facilities, and projects may also require additional training of personnel that is relevant to the site-specific hazards associated with their work and facilities, and the requirements are typically documented in Tier 3 documents, project-specific documents, or required permits. Work restrictions are imposed on new employees as necessary until required ES&H training has been received and/or on-the-job-training demonstrates that the supervisor is satisfied with the employee's competence.

The above requirements apply to all employees of ANL including students, temporary workers, special term appointees, etc. Visitors and service contractors, however, fall into three classes: 1) those who complete the above training process (normally a planned stay over ten business days); 2) those who have service contracts, receive the Contractor Safety Orientation, and arrive with other necessary regulatory-required training completed; and 3) those who are supervised during their time at ANL. In the first case, the host is responsible for ensuring that the visitors are escorted/supervised until the appropriate training is obtained; in the second case, the technical representative for the contract ensures the proper training has been completed; and in the last, the host is responsible for continual supervision.

Specific ANL *Policy Manual* sections that discuss competence being commensurate with responsibility include Chapter 7, *Health, Safety and Environmental Protection*; Chapter 8, *Human Resources* and Chapter 12, *Quality Assurance*.

3.4 Balanced Priorities

Resources shall be effectively allocated to address safety, programmatic, and operational considerations. Protecting the public, the workers, and the environment shall be a priority whenever activities are planned and performed.

ANL operates within the constraints defined by the available funding and resources. ANL activities are funded through mechanisms discussed in Section 2.2.6. The responsibility and authority for integrating ES&H considerations into work planning and conduct is clearly

established within line management. Line management uses a graded approach in applying ES&H requirements that is based on the risk that an activity presents to personnel, the environment, ANL, and the quality of the activity itself. Therefore, ensuring that ES&H considerations are given the highest priority (per Chapter 7, *Health, Safety, and Environmental Protection*, of the *ANL Policy Manual*) is part of the role of line management. The process of determining the appropriate balance for the activity is implemented at all levels of ANL through work planning. Oversight by line supervisors, support groups, oversight organizations, and committees provides feedback on the planning and facilitates implementation of the appropriate balance. In total, the mechanisms mentioned help ensure that individuals are not placed in a position to compromise ES&H for schedule, financial, or technical considerations.

One other *ANL Policy Manual* section that discusses the responsibility for balancing priorities is Chapter 11 Part 11.2, *Operation and Maintenance of ANL Buildings and Facilities*. *ESH Manual* Chapters 1-1 and 10-1 state that the Laboratory Director is responsible for providing resources to implement the ES&H programs, and line management is given the responsibility of supporting the ES&H program and appointing appropriate personnel to implement it.

3.5 Identification of Environment, Safety, and Health Standards and Requirements

Before work is performed, the associated hazards shall be evaluated and an agreed-upon set of safety standards and requirements shall be established which, if properly implemented, will provide adequate assurance that the public, the workers, and the environment are protected from adverse consequences.

The standards and requirements to be applied at ANL are documented as described in Section 2.3. The requirements flow down from DOE Orders, State EPA permits, OSHA regulations, other regulations and good practices identified from various external sources. The *ESH Manual* defines the majority of ES&H standards and requirements applicable at ANL. They address known hazards associated with activities at the Laboratory and capture not only DOE directives but also federal, state, and local regulations. For particular activities, requirements may be defined in topic-specific manuals such as the *Nuclear Safety Procedures Manual*, *Transportation Safety Manual*, *Waste Handling Procedures Manual*, etc. For many environmental activities, the requirements are defined in environmental permits issued by state regulatory agencies.

Line management is responsible for determining the applicability and application of the requirements to a specific activity. The support mechanisms and organizational structures discussed in 2.2 assist line management in making the determination and provide the checks and balances to assure appropriate application.

Specific *ANL Policy Manual* sections that relate to identification of standards and requirements include Chapter 7, *Health, Safety, and Environmental Protection*; Chapter 8, *Human Resources*, Chapter 11 Part 11.2, *Operation and Maintenance of ANL Buildings and Facilities*; and Chapter 12, *Quality Assurance*.

3.6 Hazard Controls Tailored to Work Being Performed

Administrative and engineering controls to prevent and mitigate hazards shall be tailored to the work being performed and the associated hazards.

Hazards are identified through use of the mechanisms related to the documents and responsibilities discussed in Sections 2.2 and 2.3. The level of formality used to identify the hazards is commensurate with the risk of the activity. Similarly, the mechanisms discussed in Section 2.2 and 2.3 are used to identify and develop appropriate controls that are based on the identified hazards. Barriers and/or controls against hazards are categorized and applied in the following hierarchy: engineered controls, administrative controls, and personal protective equipment. The control is applied in a risk-based manner that is tailored to the activity.

Implementation of controls is evaluated through such things as equipment and load testing programs, periodic calibrations, limiting conditions for operations, warning signs, work permits, and procedural requirements. Management and independent assessments are also used to verify implementation.

Specific ANL *Policy Manual* sections that discuss hazard controls and related responsibilities include Chapter 4 Part 4.1, *Construction Project Management*; Chapter 7, *Health, Safety, and Environmental Protection*; and Chapter 12, *Quality Assurance*.

3.7 Operations Authorization

The conditions and requirements to be satisfied for operations to be initiated and conducted shall be clearly established and agreed upon.

Overall, ANL is authorized to operate by the contract between the DOE and the University of Chicago. Authorizations also come in the form of environmental permits and plans that satisfy the requirements of environmental laws.

The responsible line manager authorizes work at ANL. The conditions and requirements for work authorization are determined by use of the processes discussed in Section 2.3 and in relation to the other Guiding Principles above. The formality of the authorization (i.e., the specific method used) is graded based on the risk of the activity. Higher risk activities require the more formal reviews and higher-level authorizations; the processes for specific activity authorizations are discussed in the appropriate Tier 2 and 3 documents. The ASPM and the NSPM discuss the need for operation readiness reviews, safety documentation, and operations approval levels for accelerator and nuclear facility start-ups. For the Category 2 Nuclear Facilities, the DOE documents and approves Authorization Agreements. The DOE approves NEPA documents and authorizes designated ANL personnel to determine that certain activities are covered by DOE categorical exclusion determinations, as described in *ESH Manual* Chapters 10-2. Other activities may require specific environmental permits or revisions to permits, and the processes for these permits are documented in ANL *ESH Manual* Chapters 10-1, 3, 4, 6, and 13.

Research projects are authorized through the Funds Allocation System (as defined in the ANL Budget Management Policy and Procedure Manual); funding authorization comes from a Works Project Authorization, which establishes the cost code for the task. Authorization for an experiment is based on a divisional process (ref. *ESH Manual* Chapter 21-2). Day-to-day tasks are either authorized through the use of one of ANL's operating permits (e.g., safe work permit, digging permit, hot-work permit, confined space permit, etc.) that are described in *ESH Manual* Chapter 7-3 or by an immediate supervisor through a work schedule or pre-job meeting. These latter type authorizations may or may not be documented at the discretion of the supervisor.

Operations considered skill-of-the-craft or those containing hazards routinely encountered and accepted by the majority of the public may be informally authorized by the worker.

In authorizing work by service and construction contractors, ANL includes a safety clause in contracts. Categorization of risk (low, moderate, or high) is made by the PFS or designated division personnel. The ANL Procurement Department then inserts the appropriate safety clause for the risk determination. For contracts involving moderate- or high-risk activities on-site, the safety clauses contain the essence of DEAR Clause 48 CFR 970.5204-2. Work is not authorized unless the contractor meets all the requirements in the contract safety clause.

Specific ANL *Policy Manual* sections that discuss work authorization responsibilities include Chapter 4 Part 4.1, *Construction Project Management*; Chapter 6 Parts 6.5, *Preparation, Submission, and Approval of Work-for-Others Proposal*; Chapter 7, *Health, Safety, and Environmental Protection*; Chapter 8, *Human Resources*; Chapter 11 Part 11.2, *Operation and Maintenance of ANL Buildings and Facilities*; and Chapter 12, *Quality Assurance*.

4.0 Core Functions

The five functions documented in the ISM policy describe a cycle that reasonably represents how

work is completed at all levels of an organization. The first three steps constitute work planning, then comes work conduct, and finally feedback. The five functions are:

1. Define the Scope of Work - *Missions are translated into work, expectations are set, tasks are identified and prioritized, and resources are allocated.*
2. Analyze the Hazards - *Hazards associated with the work are identified, analyzed, and categorized.*
3. Develop and Implement Hazard Controls - *Applicable standards and requirements are identified and agreed-upon, controls to prevent/mitigate hazards are identified, the safety envelope is established, and controls are implemented.*
4. Perform Work within Controls - *Readiness is confirmed and work is performed safely.*
5. Provide Feedback and Continuous Improvement - *Feedback information on the adequacy of controls is gathered, opportunities for improving the definition and planning of work are identified and implemented, line and independent oversight is conducted, and, if necessary, regulatory enforcement actions occur.*

This section discusses the work cycle as it is implemented at ANL. Section 4.1 gives the cycle used at the institutional level (i.e., ANL, ALD, Division, and Facility). Section 4.2 describes how the “day-to-day” tasks are completed and how these tasks follow the same cycle. Section 4.2 discusses the implementation of the five functions in general terms and in specific categories that represent the majority of work conducted at ANL. The categories are research and development activities, construction, facility operations, maintenance activities, and administrative tasks.

4.1 Institutional Level

Define the Scope of Work

ANL management's vision of the optimal future development of Laboratory activities is documented in the Institutional Plan, which is the result of the overall planning process. The Institutional Plan outlines the development of both research programs and support organizations in the context of the DOE and ANL, and expected resource constraints (including facilities and expertise). The final plan is the culmination of an annual planning cycle that starts with many individual discussions between the DOE and ANL Program Managers and Principal Investigators and proceeds through several iterations of both formal and informal reviews by ANL and DOE personnel. The final Plan also reflects programmatic priorities developed during the strategic planning process that allocates the Laboratory Directed Research and Development (LDRD) funds. Finally, the Plan summarizes specific ESH&I plans and Environmental Restoration Projects.

The specific programs discussed in the Institutional Plan are funded or not, based on the available funds and the needs of the sponsoring organization. The work that is funded is broken down into specific tasks by the responsible Program Manager, Principal Investigator (PI), or Project Manager (see Section 2.2.6).

Specific sections of the ANL *Policy Manual* that establish the requirements for defining the scope of work at ANL include Chapter 4.1, *Construction Project Management*; Chapter 6 Parts 6.5, *Preparation, Submission, and Approval of Work-for-Others Proposals*, 6.8, *Use of Professional, Technical and General Personal Services*; Chapter 7, *Health, Safety, and Environmental Protection*; Chapter 8, *Human Resources*; Chapter 10.1, *Procurement Policy*; Chapter 11 Part 11.2, *Operation and Maintenance of ANL Buildings and Facilities*; and Chapter 12, *Quality Assurance*. Environmental regulations or permit conditions may also enter into defining the scope of work.

Analyze the Hazards

The hazards at ANL, in general, are well known and documented in environmental permits and Tier 2 and 3 documents (see Section 2.3). The *ESH Manual* is the result of analyses of the hazards present; the manual is organized by subject area and concentrates mainly on hazards under both normal and unusual (non-typical) operations. An ANL Environmental Management System (EMS) description has been written, approved by DOE, and placed on the EQO website. This description provides great detail on the program and is summarized below.

As part of the EMS, line management considers environmental impacts from all its operations and changes thereto by filling in environmental review forms (ERF). These forms and where necessary, subsequent NEPA documentation are provided to DOE to initiate required NEPA reviews. Analysis of environmental releases is documented in the environmental permit agreements required by federal and state regulations. The Comprehensive Emergency Management Plan for ANL concentrates on the hazards expected under off-normal conditions.

For each nuclear facility, formal hazards analyses have been completed in accordance with the requirements in the NSPM. Each nuclear facility has a DOE-approved documented safety analysis (DSA) or basis of interim operation (BIO); each Category 2 Nuclear Facility has an approved Authorization Agreement and a Technical Safety Requirement (TSR) or set of

Operational Safety Requirements (OSR). Each significant change in a nuclear facility is reviewed using the Unreviewed Safety Question (USQ) process. New DSAs and significant changes to existing safety documents are reviewed by the NSC and then sent by the Laboratory Director to DOE for approval.

For each accelerator facility, formal hazards analyses have been completed in accordance with the requirements in the ASPM. Each accelerator has a safety assessment document (SAD) and accelerator safety envelope (ASE) that has been approved by the responsible ALD and DOE. Each significant change in an accelerator facility is reviewed using the Unreviewed Safety Issue (USI) process. New SADs and significant changes to existing safety documents are reviewed by the ASRC and then sent by the Laboratory Director to DOE for concurrence.

Specific ANL *Policy Manual* sections that establish the requirements for analyzing hazards prior to commencing work include Chapter 4.1, *Construction Project Management*; Chapter 6 Part 6.5, *Preparation, Submission, and Approval of Work-for-Others Proposals*, Chapter 7, *Health, Safety, and Environmental Protection*; Chapter 8, *Human Resources*; Chapter 10, *Environmental Protection*; and Chapter 12, *Quality Assurance*.

Develop and Implement Hazard Controls

Required and recommended controls to prevent/mitigate hazards present at ANL are documented in environmental permits and the Tier 2 documents (see Section 2.3). At the Division level, Tier 3 documents describe the specific application of controls applicable to the hazards present in a given Division or facility. The application of controls to a specific activity is part of the planning for the activity by line management, as discussed in Section 4.2.

Implementation of the hazard controls is ensured through use of the oversight functions discussed in Section 2.2. Depending on the activity, line management, the line safety organization, support services, EQO, and/or Lab-wide committees provide oversight.

Specific ANL *Policy Manual* sections that establish the policy for developing and implementing controls prior to commencing work include Chapter 4.1, *Construction Project Management*; Chapter 7, *Health, Safety, and Environmental Protection*; and Chapter 12, *Quality Assurance*.

Perform Work within Controls

At the Institutional level, readiness to perform work is assured through the operations authorization mechanisms discussed in Section 3.7. The oversight mechanisms discussed in Section 2.2 (including that by line management, support service, EQO, etc.) assures that activities at ANL (both institutionally and at the work activity level) are performed appropriately according to the plans. As mentioned previously, persons working at ANL have the authority and responsibility to stop the work if they are involved in or see an activity not being done with the appropriate considerations to ES&H concerns.

Specific ANL *Policy Manual* sections that establish policy for performance of work include Chapter 7, *Health, Safety, and Environmental Protection*; Chapter 8.1, *Human Resources*; and Chapter 12, *Quality Assurance*.

Provide Feedback and Continuous Improvements

Processes for feedback and continuous improvement are in place to ensure that the appropriate hazards present at ANL are documented in the Tier 2 and 3 documents, to evaluate the sufficiency of the controls for the hazards, and to provide a path for improvements to work

practices. In addition, ANL has the appropriate processes to evaluate feedback and determine whether reporting to an outside regulator is appropriate; such reporting is done in concert with DOE-ASO. The components of the program in place at the institutional level include the external reviews of the programs and processes at ANL, plus all of the organizational structures, documentation processes, and horizontal integration mechanisms discussed in Section 2.0. Together, these components are used to gather information from internal and external sources, elevate the information to the appropriate level that can affect changes, and disseminate the information to ANL personnel for implementation of process improvements. Some of the more important of those mechanisms and a summary of ANL's programs for reporting incidents to DOE (ORPS, NTS, or CAIRS) or other regulatory bodies are discussed in this section.

Feedback and information used to improve ANL processes come from both external and internal sources. The Board of Governors and DOE-ASO perform external reviews of ANL's programs and processes regularly. The Board of Governor's ES&H Committee reviews the overall ES&H performance. DOE-ASO conducts an assessment of ANL (annually with a semi-annual status), and part of that assessment covers the ES&H performance. Other external groups who review Laboratory operations include DOE headquarters groups, the U.S. Environmental Protection Agency (EPA), the Illinois Environmental Protection Agency (IEPA), and certain program sponsors (both governmental and non-governmental). The reports from these reviews are used to measure the effectiveness of and to improve the programs; for assessments that result in specifically identified deficiencies or opportunities for improvements, ANL prepares a corrective action plan, and EQO tracks the implementation of the actions. Other external sources for information that are used to improve processes at ANL include lessons-learned reports (particularly those disseminated by the Society for Effective Lessons Learned), ORPS reports, and NTS reports, as well as information gleaned from attendance at topical meetings and conferences of appropriate professional societies and working groups. The channels for incorporating lessons into improving ANL processes include the paths for getting the information to EQO, and other organizations responsible for Tier 2 documents and the process for revising those Tier 2 documents; these were discussed in Section 2.2 and 2.3.

Internally, feedback can come from Lab-wide assessments, through the line organization, through the line safety organization, via one of the oversight structures such as the Laboratory Committees or EQO, or directly from an ANL employee. The performance-based Contract between the DOE and the University of Chicago includes the requirement for establishing and monitoring performance measures, including those for ES&H; Appendix B of the Contract describes the process. The performance measures are tracked on a monthly basis and updated as data and progress information become available. This frequent tracking and updating allows for system improvements to measure effectiveness and improve performance throughout the year.

The Contract also requires an annual self-assessment of operations, including ES&H performance. DOE-ASO uses the results of the ANL self-assessment as the basis for their annual assessment of ANL. The ES&H portion of the ANL self-assessment is a roll-up from the ALD/COO and Division self-assessments discussed below. Guidance for the self-assessments is disseminated by EQO.

The principles of the ANL self-assessment program are described in the ANL QAPP; Division specific assessment programs are defined in the Division QAPs. The self-assessment program includes management assessments and independent assessments. Generally, the independent assessments conducted or coordinated by EQO are topical reviews of subjects specified by DOE

or determined to be of value to ANL by the Laboratory Director, EQO or another ANL organization. An ad hoc review committee is established and contains representatives from various organizations around the Laboratory that can provide perspective or are affected by the subject area. For example, past topical reviews have covered criticality safety, environmental vulnerability, chemical vulnerability, and hoisting and rigging. In addition, ANL, an ALD/COO, or a Division conducts formal investigations of incidents; for investigations conducted by an ALD/COO or a Division, EQO is kept informed of the results and recommendations. The findings, deficiencies, recommendations and opportunities for improvement are corrected and reviewed for incorporation into ANL's processes as appropriate. EQO tracks all identified issues raised during EQO and DOE assessments, investigations, and safety reporting that are required to be forwarded to DOE systems such as Incident Reports, NTS reports, environmental monitoring, and permit compliance reports.

Routinely, issues raised through the line organization are discussed at Management Council meetings, at which ES&H performance is a standing agenda item. Information is generated as a result of management walk-throughs, safety meetings, post-job briefings, occurrences or other incidents, or informal meetings. In addition, EQO discusses ES&H items, including occurrences, trending, and safety data and provides information to the ALDs and COO, who in turn use the information in staff meetings with their respective Division Directors and staff.

Feedback also comes through other committee meetings and gatherings of functionaries from ANL Divisions. These include the ES&H/QA Oversight Coordinating Committee meetings, during which the various ALD/COO ES&H/QA Representatives discuss implementation issues in their research directorates; the Land Management and Habitat Restoration Advisory Committee meetings, which concentrate specifically on environmental issues that affect ANL as a whole; and ES&H Coordinator, ECR, and QAR meetings, which concentrate on division-level issues.

Employees have several mechanisms available to provide feedback; the mechanism chosen is related to the desired audience. Feedback is given at scheduled and ad hoc Division-level meetings, Division safety committee meetings, or through informal communications to line management. Feedback is also given after each training session; employees are encouraged to comment on the training and its applicability to the employee's organization as well as discuss good practices from the employee's organization that should be used lab-wide. The Laboratory also maintains an IMPACT program (ref., HR Procedure 6200), in which an employee can document a specific recommendation or raise an issue (anonymously, if desired). The issues are gathered by HR and given to the appropriate SME for response. If appropriate, the SME can use the suggestion or issue to modify ANL processes.

If the feedback comes in the form of a reportable incident or issue for which DOE, the state, or federal regulators must be formally notified, ANL maintains programs to satisfy the ORPS, CAIRS, NTS, OSHA, SARA Title III and environmental permit violation reporting requirements. The applicable processes are documented in ESH Manual Chapter 1.2, *PAAA Compliance Validation and Noncompliance Reporting Program*, and Chapter 1.7, *Incident and Near Miss Reporting and Analysis*.

ANL maintains a lessons learned program (ANL ESH Manual Chapter 1-12, Lessons Learned Program). The program gathers information from external sources (SELLS reports, ORPS, etc.), serves as a repository for information that may be of benefit to ANL organizations, and provides information to the appropriate SME so that changes may be implemented. To institutionalize

new Lessons Learned information, subject matter experts review the existing Laboratory manuals, requirements, procedures, and work practices and, as necessary, initiate changes to ensure the lessons learned information is incorporated in the appropriate training classes, materials, meetings, and divisional activities. EQO coordinates this program and maintains the ANL Feedback and Lessons Learned Home Page, accessible through <http://www.anl.gov/EQO/>.

The information is then evaluated for applicability and potential for improvement to ANL processes, and it is provided to ANL organizations and employees for use in their operations. The mechanism for improving ANL processes was discussed in Section 2.3; EQO is responsible for ensuring that the information gathered is given to the organization that can affect changes to ANL processes. EQO also evaluates feedback from within ANL for dissemination to the rest of the DOE complex through the Society for Effective Lessons Learned (SELLS) or DOE-ASO.

Dissemination of information and improvements to processes is completed through the forums discussed above, committee or functionary meetings (discussed in Section 2.2), various ANL web-sites (accessible through <http://www.anl.gov/>), and through informal means (e.g., memos, e-mails, phone calls, etc.). In addition, ANL uses a mechanism known as the Division Director/Department Head (DD/DH) mailing list to give information or provide requests directly to each division at ANL. Information is given to the employees through the ANL and Division training courses, performance evaluations (if specific to an individual employee), all-hands meetings, or one of the many broadcasting mechanisms available. The latter include newsletters (Argonne Week, Insights, etc.), postings on bulletin boards (announcements, posters, safety alerts), circulating reports and memos, or mailings to all ANL personnel (including e-mails).

An additional forum used to receive feedback and disseminate information is the Community Leaders Roundtable. ANL works closely with DOE-CH and DOE-ASO to keep the leaders from communities neighboring ANL informed about the Laboratory's activities and expected impacts on the surrounding area.

Specific ANL *Policy Manual* sections that relate to collecting feedback and incorporating feedback into process improvements include Chapter 7, *Health, Safety, and Environmental Protection*; Chapter 8, *Human Resources*; Chapter 11 Part 11.2, *Operation and Maintenance of ANL Buildings and Facilities*; and Chapter 12, *Quality Assurance*.

4.2 Work Activity Level

The work activity level includes the “day-to-day” tasks that are planned and completed in support of the programs and projects discussed in Section 4.1. The implementation of the core function is described in the following sections as it applies to the specific categories of work conducted at ANL experimental activities, non-experimental work activities, project management, facility operations, site and facility maintenance activities, and administrative tasks. The cycles of work for each category operate under the umbrella of the guiding principles discussed in Section 3 by using the mechanisms and relying on the responsibilities discussed in Section 2. Note that for a given task or project, there may be components of several different categories of work, and the specific steps followed for a given project may reflect this crossover. Further, it should be understood that the formality of implementation (i.e., the level of rigor of the reviews or the amount of documentation) will vary based on the risk presented by the given task or project. The sections below serve as summaries of the mechanisms available for a given

category of work, and how they are used, as appropriate, for a given task or project. (See also section 4.2 of the EMS description document)

4.2.1 Experimental Activities

One of the principle functions of ANL is to conduct experiments, tests and other research and development activities such as modeling, theoretical studies, mathematics and computer science, and information analysis. Experimental activities encompass both bench-scale and larger-scale activities, as well as off-site field studies and visits to non-ANL user facilities, and include all phases of the activity, such as design, conduct, data analysis, etc. This section discusses the application of the five core functions in experimental activities; Sections 4.2.2 – 4.2.5 discuss other types (non-experimental) of activities. ANL *ESH Manual* Chapter 21-2, *Experiment Safety Review* describes some of the requirements in more detail; other requirements are established in the ANL QAPP and other Tier 2 manuals.

Define the Scope of Work

The definition of the scope begins with the approval of the work statement and the budget authorization. The statement of work is redefined as a set of serial and parallel activities and tasks. Resources required for each step are assessed and the activities, tasks, and resource availabilities are iteratively reassessed until a task plan is constructed.

Each Division conducts reviews of experiments and other activities using a process established by the Division in accordance with ANL *ESH Manual* Chapter 21-2; the process is generally defined in a Tier 3 manual. Conformance with environmental regulations and environmental permit conditions is evaluated through the environmental review process in accordance with ANL *ESH Manual* Chapter 10. Some reviews address single short-term experiments, while other reviews may address a long-term series of tests, analyses, or experiments for which hazards are relatively invariant in type and degree. An experiment safety review may address the activities of only a few individuals or a larger group of personnel who work in a single facility.

In preparation for the review, the experimenter (often the PI for the activity) prepares documentation that defines the scope and purpose of the experiment(s). The documents may include a one or more completed forms, narrative descriptions of hazards and hazards controls in accordance with a specified format such as a Project Review Document, an Experiment Safety Document, work plans, equipment designs, operating procedures, etc.; for purposes of this section, the group of documents will be referred to as experiment safety review (ESR) documents. The ESR documents describe the location, equipment, materials etc. for the planned activity and identify the participating personnel.

Analyze the Hazards

The PI, with input from Division and Laboratory ES&H personnel and manuals, analyzes the hazards present in the experiment(s) in the ESR documents. Sources used to identify hazards generally include training, documented hazard analyses, previous experiment safety reviews, procedures from similar activities, divisional self-assessment processes, the ANL ESH Manual, SMEs, and experience and knowledge of others including the experimenter.

The reviewers of the ESR documents may include the Division ES&H Coordinator, a Division safety committee, an ad hoc review committee, an ANL committee, or other individuals or groups. The level of review and authorization is commensurate with the severity of the hazards.

In addition, each experiment(s) undergoes an environmental (NEPA) review, which is completed during initial evaluation and planning to determine the hazards and environmental impacts present and controls necessary for the experiment(s). The NEPA process is described in ANL *ESH Manual* Chapter 10-2, *National Environmental Policy Act Implementation*. The environmental review is verified by the appropriate NEPA owner, reviewed by the EQO-Environmental Planning and Compliance group including the ANL NEPA Reviewer, and reviewed or approved, as appropriate, by DOE-ASO.

For specific activities, the Laboratory has established permits, which provide a formal structure for identification and control of work-related hazards. Work permits and authorizations that may be applicable to conducting experiments include:

- Electrical Hot Work Permit
- Lock-Out/Tag-Out Procedure
- Open Flame Permit
- Radiation Work Permit (RWP)
- Hot Work Permit
- Confined Space Permit
- Environmental Permit
- The ANL Laser Safety Officer review of standard operating procedures for lasers

Develop and Implement Hazard Controls

The analysis of the hazards will result in identification of the controls necessary to mitigate the consequences. The controls will typically include one or more of the following elements: a) administrative controls such as procedures, training, qualifications, etc; b) engineered, or active, controls such as automatic shutoffs, alarm systems, automatic safety system activation, etc; and c) passive barriers such as shielding, containment, personal protective equipment, etc. For non-routine laboratory hazards, the required controls will typically be documented in the ESR documents. For office or routine laboratory hazards, the controls will generally be documented in the ANL ESH Manual, the environmental permits, or possibly in another Tier 2 or a Tier 3 document (see Section 2.3).

The hazards and necessary controls, as well as the scope, purpose, and deliverables, are communicated to the workers through the ESR documents, procedures, training, during planning meetings, or verbally by the PI or line supervisor. The specific method of communication is graded based on the hazard and complexity of the controls.

Perform the Work Within Controls

The individuals perform the experiment(s) as defined in the documents discussed above. All employees have the right and responsibility to stop an activity if they have concern for their safety or the safety of others.

To ensure that experiments are being conducted in accordance with the Division procedures and established controls, Divisions use various mechanisms, including walk-throughs by Division management, ES&H Coordinators, or safety committees. Managers and/or supervisors typically maintain a presence during the course of the work activity to check on technical progress or problems and to be alert to potential ES&H awareness lapses or problems on the part of those doing the work. They are expected to recognize and address problems/deviations.

Provide Feedback and Continuous Improvement

There are various mechanisms used to provide feedback from research and development activities. First, the experiment results are a natural form of feedback that allows an experimenter to assess the apparatus, experiment conduct, analysis, etc. Dissemination of the results (either informally or by publication) also provides a mechanism for feedback from peer reviewers, as well as continuous improvement by other researchers. Second, safety concerns may be discovered by Division personnel during walk-throughs or the by the PI in conducting the experiment. Safety issues of immediate concern are addressed immediately; the lessons from incidents and near misses are also shared with others both in the Division and around the Laboratory for use in subsequent activities with similar hazards.

4.2.2 Non-experimental Work Activities

Non-experimental work includes jobs and tasks that are performed to accomplish activities considered maintenance, waste operations, construction, demolition, service contract, and maintenance-like support to the experimental programs. Many of these specific activities are discussed in subsections following this one. This will discuss the overall process to be used for non-experimental activities.

Define the Scope of Work

The job planner must obtain sufficient information from the work requesters to develop an adequate scope of work. The level of detail is to be commensurate with the importance of the work, its complexity and the potential risk of associated hazards. This may be done as part of an initial work request, but can include more formally documented plans such as those required in construction or other projects.

Analyze the Hazards

All non-experimental work activities are to be evaluated by a hazard analysis process. If the activity has been previously addressed formally in other tier 2, tier 3, or sub-tier 3 documents, including an adequate hazard assessment and control process, additional hazard analysis is not required. For work that is not addressed in other tiered documents, a Hazard Assessment Checklist (ANL-644) can be used along with the employees doing the work to develop adequate hazard controls.

Develop and Implement Hazard Controls

Using the scope of work and the Hazard Assessment Checklist as guidance, line supervisors and employees review the scope, determine the work activities necessary to accomplish the scope, identify hazards associated with those work activities, and determine the hazard controls that will be followed in performing the work. For work activities determined to involve high ES&H risk, or that have extensive location requirements or complexity, formal documented control measures must be included with the hazards analysis. Permits, MSDSs, JSAs etc., can be attached to the Hazard Assessment Checklist as part of the work package.

Perform the Work Within Controls

Line supervisors and employees performing the work must review the hazards assessment package prior to initiating the actual work to ensure that everyone is aware of how the work will proceed. The hazard analysis must be revised as necessary when there is a change in the work scope, work conditions change, new hazards are identified, or the controls prove inadequate or ineffective. For work that is repeated in intervals of 180 days or more, the hazard analysis and controls must again be reviewed before work begins.

Provide Feedback and Continuous Improvement

The hazard analysis is updated after the activity has been completed as necessary, to include improvements that were identified while performing the work. Line supervisors are to provide copies of the hazard analysis to the division ESH coordinator or safety coordinator for the purposes of providing oversight, trending, and lessons learned.

4.2.3 Project Management (Construction, Environmental, Scientific and Other Types of Projects)

ANL maintains a project management program that is documented in the *Project Management Manual*. The steps used to implement a project at ANL are summarized in the following sections and comes from that *Manual*. While many projects are managed by the Office of Project Management, other ALD organizations may also manage projects. For those organizations the use of the procedures contained in this *Manual* are mandatory for construction and environmental projects and project-related contracts from \$250K and above, and is recommended for all other types of projects below this range. Major system project acquisitions may be documented in a tailored, more project-specific management system as long as there are processes in place similar to those defined in the *Manual*.

Define the Scope of Work

For project work, the process starts when DOE accepts a Justification of Mission Need document, Acquisition Strategy and/or Acquisition Plan, and validation review. A formally approved and communicated baseline must then be established that integrates the technical objectives and requirements with the cost and schedule objectives.

Analyze the Hazards

For projects, a risk analysis must be performed as a tailored approach based on the projects complexity, cost, and schedule. This risk based approach helps the project manager determine the proper degree of formal control procedures. Factors such as complex technology, regulatory impact, environmental impact, critical testing, etc., could have an effect on the degree and nature of controls needed to keep the project on cost and schedule while assuring it will safely accomplish its objectives. The risk analysis is to be documented in the Project Execution Plan.

Additional ANL permits may be required to be completed to provide documentation of certain hazards and authorizations for specific activities. These permits may include:

- Confined Spaces Entry Permit
- Digging Permit
- Electrical Hot Work Permit

- Lock-Out/Tag-Out Procedure
- Open Flame Permit
- Radiation Work Permit (RWP)
- Work Entry Permit

Develop and Implement Hazard Controls

The documents and permits mentioned in the previous sections document the controls necessary to complete the work with the appropriate ES&H considerations. In addition, non-ANL construction personnel complete a contractor orientation course and have their tools and equipment inspected to ensure they meet safety standards.

Perform the Work Within Controls

The project manager prepares, submits and obtains approval for a Work Project Authorization which ensures that funds are expended only for specific project work. The project manager notifies the contractor when all controls and approvals are in place, and the contractor starts the work. The process for choosing the appropriate contractor and documenting the controls and plans helps to ensure that the work will be completed within those controls. For construction projects, an ANL construction field representative is appointed who ensures that the construction activities are inspected at least daily for conformance with contract requirements. Project managers enforce compliance with the plans as part of their normal management functions.

Provide Feedback and Continuous Improvement

On a biennial basis, throughout the life of a project, self assessments are to be conducted to evaluate the effectiveness of their project management systems and the adequacy of their organization's performance. When the project is completed, the as-built drawings are recorded and any change orders are resolved. A final acceptance statement is documented by the governing authority that the work performed by the construction contractor has been accepted as being in accordance with approved plans and specifications. The operating organization is to be included in the final acceptance, if applicable, indicating acceptance of the facilities as constructed and the date the facilities are to be occupied or available for the use of operating organization. Each of these steps allows for documentation of feedback on the project itself and the process.

4.2.4 Facility Operations

ANL operates a number of facilities. These include support facilities, nuclear facilities, accelerator facilities, and other R&D facilities. Some of the facilities are "User Facilities" (e.g., APS, ATLAS, IPNS), which are operated to allow users from both ANL and non-ANL organizations to conduct research using the specialized technical capabilities available. The steps used in implementing the core functions in the operation of the facilities are discussed below. The activities conducted in the facilities by users and researchers are considered research and development activities. For such activities, the facility establishes the process by which the user and researcher activities are reviewed and approved; the facility process follows the cycle described above in Section 4.2.1.

Define the Scope of Work

The overall scope of facility operations is generally found in the annual FWP. Facilities also discuss the mission and scope in the safety analysis documentation.

To satisfy the operational needs, the management of user and large research facilities develops appropriate strategies that may include modes of operation, staffing plans, new instruments/equipment, required financial resources, and time schedules. Based on the plans established, day-to-day tasks are assigned on work schedules and assignment lists or through scheduling meetings. The formality in defining the scope will depend on the risk involved in the task. For complex tasks, a work plan is established to detail the scope of the task. Typically, the task has a standard operating procedure to detail the steps involved. Further, the task may require a permit, such as a RWP, which would be used to further document the scope. For routine tasks, the training provided to the facility operators in their qualification process is generally sufficient to allow for informal definition of the scope. While procedures may be used to control some of the routine tasks, others are covered by general guidance documents or operating principles. Modifications to facilities would be considered either service work (see Section 4.2.2) or maintenance (see Section 4.2.4).

For smaller research activities, each division establishes criteria for conducting experiments, designing related experimental equipment and completing safety reviews prior to performing proposed experiments. The Principal Investigator is normally responsible for establishing the scope of work in a FWP.

Analyze the Hazards

Facility documents, such as a SAD, DSA, ERF or experiment safety review, contain the analysis of the hazards or environmental impacts related to operating the facility or the experiment within its design envelope. The safety documents cover normal operations as well as anticipated off-normal conditions. The safety documents describe, in general terms, the controls necessary to mitigate the consequences presented by the facility or experiment hazards.

The hazards and controls associated with day-to-day tasks are documented in facility safety documents or standard operating procedures for the task. Specific technical procedures or hazard analyses may be written for a unique task or experiment or for a task that is performed infrequently.

If a permit is required for a given activity, the permit will document the hazards present. One example of a permit is the RWP, which is used for higher hazard radiological work. The RWP documents the analysis of the radiological hazard present and the appropriate controls (e.g., personal protective equipment) necessary to mitigate the consequences from the hazard.

To ensure that the hazards of the activity have been analyzed appropriately, the Divisions and Facilities have mechanisms in place in addition to those discussed in Section 2.2. Division safety committees conduct inspections and reviews. Experiments are reviewed for safety by knowledgeable individuals who neither directly supervise nor perform the proposed experiment. In addition, special ad hoc safety reviews are conducted when deemed appropriate.

Develop and Implement Hazard Controls

A defense-in-depth philosophy with different levels of protection is taken to control major facility hazards. The approach includes a combination of engineering and administrative controls.

For day-to-day activities, the controls to mitigate the consequences from these hazards are typically established at the Laboratory level in Tier 2 documents (see Section 2.3). Facility-specific controls are defined in the standard operating procedures, work requests, verbal instructions and work permits. Facilities require that technical procedures for a wide variety of operation and specific hazards are written and that special reviews are conducted of non-routine and new operations.

Implementation of the controls is assured through use of appropriately qualified workers, management walk-throughs and inspections, and pre- and post-job briefings. Conduct of appropriate maintenance, which is performed in each facility, can also be considered a form of hazard control.

Perform the Work Within Controls

The researchers complete their assigned tasks and activities in accordance with the schedules, work plans, procedures, etc. If conditions change or the activity is deemed unsafe, facility personnel stop the work and evaluate the appropriate prerequisites for continuing the activity.

Provide Feedback and Continuous Improvement

There are various mechanisms to provide feedback on facility operations and activities. Feedback and suggestions for improvement come from management assessments (e.g., safety walk-throughs), independent assessments, user forums (conferences, meetings, or informal communications), or from facility operators at meetings. External lessons-learned can also be considered feedback that may improve facility operations, and these lessons are distributed by EQO, an SME, or through other communication means. The feedback is evaluated by Facility management, and modifications are made, as appropriate.

4.2.5 Site And Facility Maintenance Activities

ANL's management of the site and facilities includes a systematic and comprehensive maintenance program to ensure that facilities effectively meet programmatic needs as well as ES&H and security requirements. This section discusses the application of the core functions to maintenance activities, which includes preventive, predictive, and corrective maintenance elements. It discusses the maintenance performed by the PFS building maintenance personnel and mentions the work performed by the task-oriented crafts personnel of PFS as it pertains to corrective maintenance.

Define the Scope of Work

At the facility level, maintenance work is defined by the maintenance supervisor in the Work Order, which documents the scope of work to be performed, the location, the classification of the nature of the job, and a risk level assessment. Work Orders are created for each maintenance activity including all preventive, recurring, predictive, and corrective maintenance. The Work Order process ensures that open maintenance items are included in the maintenance backlog and that all maintenance work is attached to an equipment number, prioritized for urgency, controlled, and tracked to completion. For preventive, recurring or predictive maintenance, the Site Integrated Management System (SIMS) maintains a schedule for each piece of equipment or system and generates Work Orders when scheduled maintenance comes due. The foremen are responsible for assigning and scheduling maintenance work. For maintenance associated with

the more specialized large complex operations and performed within a facility, the facility manager is responsible for assuring the appropriate maintenance is scheduled and completed.

For corrective maintenance on a system normally maintained by PFS, a Work Order is generated and handled using available resources, as described above. For maintenance on a system normally maintained by a programmatic Division (e.g., experimental apparatus), the customer generates a service request and establishes the scope of work. A crafts foreman meets with the customer to refine and revise the scope as necessary. Once finalized, a Work Order is generated and processed as above.

The Building Manager is cognizant of the maintenance activities planned and conducted in the building. The Building Manager notifies the building occupants so that adverse impacts can be minimized. The role of the Building Manager was discussed in Section 2.2.5.

Analyze the Hazards

Job Safety Analyses have been and are prepared for new jobs and for routine maintenance processes that involve “high” hazards (i.e., those with a history of causing accidents or that can cause disabling injury or death) and for new jobs. A specific Task Evaluation, as needed, is prepared to identify all known hazards, provide employee safety instructions, identify appropriate ES&H procedures, determine necessary permits, and list authorizing signatures. An ERF is filled out for all new jobs or hazards that are not already covered to define the potential impacts on the environment. The preparation of permits provides a formal structure for the identification and control of work-related hazards.

Work permits and authorizations that may be applicable to performing maintenance activities are listed below:

- Job Safety Analysis
- Environmental Evaluation Notification Form
- Confined Spaces Entry Permit
- Digging Permit
- Electrical Hot Work Permit
- Lock-Out/Tag-Out Procedure
- Open Flame Permit
- Radiation Work Permit (RWP)
- Work Entry Permit

Develop and Implement Hazard Controls

Implementation of hazard control starts with the hiring and training processes that ensure workers are qualified to perform the work. Training includes the appropriate state and national certifications, as well as a robust on-the-job training (OJT) program.

Specific controls for a given task are defined in the Tier 2 documents, job safety analyses, task evaluations, safe work permits, work entry clearances, and division-specific procedures. For maintenance activities, the controls include mainly administrative controls (training, procedures, etc.) and barriers (e.g., machine guards, personal protective equipment). The controls are reemphasized to the workers during pre-job and/or safety briefings.

Perform the Work Within Controls

The work is performed in accordance with the defined scope and within the permit stipulations. The supervisor and Building Manager assure that maintenance work is not started without the proper controls in place. Both the supervisor and Building Manager may periodically check to assure the work is being performed safely. All employees have the responsibility and authority to stop work for safety concerns.

Provide Feedback and Continuous Improvement

Feedback information on the adequacy of the work planning and procedures (including the hazard controls) is evaluated. Such feedback typically comes from the worker or from the customer informally as a result of a recently completed maintenance task.

Feedback may also come as a result of the oversight and communication activities routinely performed in PFS. PFS issues weekly ES&H reports, five-minute safety talks are conducted daily, monthly safety meetings are conducted within departments of work groups, numerous inspection processes including management walk-throughs are performed, and assessments and surveys are conducted by management and independent auditors to provide feedback for continuous improvement.

4.2.6 Administrative Tasks

Administrative tasks include support functions that allow the work activities in the above categories to take place, such as management functions, procurement activities, human resource tasks, etc. This last category of work activity was included to emphasize that considerations of ES&H are integrated into all aspects of work at ANL.

Define the Scope of Work

The scope of work for administrative tasks generally is an accepted and well-understood part of a person's job. Specific scopes of work may be verbally communicated by a line supervisor or may be formally documented, such as in a work schedule or design requirements document for a software system. The overall responsibilities are defined in Position Descriptions, Tier 2, and Tier 3 manuals.

Analyze the Hazards

The hazards for administrative tasks are generally office hazards, which are discussed in ANL *ESH Manual* Chapter 7, *Work Spaces* (specifically Chapters 7-5, 7-9, and 7-10). Each building with more than 10 employees, has an emergency plan that defines the hazards, the tornado shelter locations, and assembly areas. The hazards faced by an individual employee are analyzed as part of the JHQ process, and an appropriate training program is developed.

Develop and Implement Hazard Controls

The controls for the hazards associated with administrative tasks are largely based on common sense. Controls for some of the higher hazards are documented in the ANL *ESH Manual* and are disseminated to individual employees through training. Drills, covering fires and tornadoes, are performed twice a year.

Perform the Work Within Controls

Administrative tasks are performed in accordance with instructions and a person's training. As with all work at ANL, every employee has stop work authority if unsafe work practices are observed or unsafe work is requested.

Provide Feedback and Continuous Improvement

Because administrative tasks will affect the operations of the Laboratory, improvements in efficiency and operation can have repercussions that positively affect the safety posture of the Laboratory. Feedback mechanisms from administrative tasks are generally less formal. The fire and tornado drills are also reviewed for potential improvements.

5.0 Measures of Effectiveness and Implementation History of ISM

In keeping with the intent of DOE P450.4, ANL continues to implement and to evaluate the implementation of the ISM components into the work performed at ANL. The overall process is to 1) continually evaluate ANL's current program with regard to the requirements of ISM, 2) document any gaps and implement corrective actions to fully implement the missing components, and 3) periodically have ANL's program verified by an independent review. This section summarizes some of the major actions that have been taken; the detailed documents generated may be found on ANL's ISM web-site (<http://www.anl.gov/ISM/>) or on the EQO web-site (<http://www.anl.gov/EQO/>). Details of the overall history of ISM at ANL may be found on the ANL ISM web-site noted above and in the ANL General Operations Self Assessment. The measures of effectiveness and history highlights listed below cover the last three years.

In January 2000, the ISM System description was revised and submitted to DOE.

The ISM Verification took place from February 7-18, 2000. The final report, which was issued in June 2000 and can be found at <http://www.anl.gov/ISM/>, documented four deficiencies and eleven opportunities for improvement. All of the plans for the deficiencies and opportunities for improvement have been completed.

On September 18, 2000 the DOE Chicago Operations Manager approved the ANL ISMS Description and the ANL ISMS implementation.

Since July 2001, the entire ANL ESH Manual has been revised to document the organization and procedure changes made to be more in keeping with ISM implementation. The radiation protection sections were revised in January 2002. The ES&H Policy section in the ANL *Policy Manual* was completely revised in November 2001.

In September 2001, EQO, with periodic oversight participation from DOE-ASO, completed independent reviews of ISM implementation at ANL operations and program division. The conclusion of these reviews was that the ANL divisions continue to effectively implement ISM.

On February 7, 2002, the Laboratory Director established the Environment, Safety, Security, and Health Committee to provide him with objective and independent input and to serve as a coordination point for matters that might affect ESS&H. The Environment, Safety and Health Advisory Committee (ESHAC) was abolished.

In September 2002, EQO, with periodic oversight participation from DOE-ASO, completed independent reviews of ISM implementation at divisions with potentially hazardous operations. This was done by selecting specific work activities within these divisions to review in-depth for ISM implementation. The conclusion of these reviews was that the divisions continue to effectively implement ISM.

For FY2003, ANL achieved ratings of “Outstanding” in Environmental Protection and “Excellent” in Safety Culture, Radiological/Nuclear Safety, and Worker Safety for an overall ISM rating of Excellent. Out of a maximum of 32 performance metrics, 25 achieved the maximum point total.

In FY2003, the Environmental Restoration Program completed all of the planned resource Conservation and Recovery Act (RCRA) waste clean-up work for ANL and requested a finding of “No Further Action” from the IEPA.

The ANL Pollution Prevention Program was a 2003 DOE Award Winner. Past and current P2 initiatives have resulted in over \$11 million in revenues and cost savings to research and operations.

In June 2003, the Environmental Management System description was completed for the ANL site and approved by DOE.

In FY 2004, a major reorganization occurred within the Laboratory and the number of ALD groups was reduced from four to three. The Criticality Safety Committee and the Nuclear Safety Committee were combined. In January 2005, the ANL-West site was removed from the University of Chicago contract and made a part of the INL. As a result, the type and number of hazardous operations was significantly reduced.

The implementation and effectiveness of ISM will continue to be measured through a combination of the Contract performance measures, the self-assessment process required by the ANL QAPP of management and independent reviews.

Attachment A –

Environmental Management System (EMS)

Description Document



ARGONNE NATIONAL LABORATORY

ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) DESCRIPTION DOCUMENT

September 2005



**THE UNIVERSITY OF
CHICAGO**



**Office of
Science**
U.S. DEPARTMENT OF ENERGY

Argonne National Laboratory is managed by
The University of Chicago for the U. S. Department of Energy

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ACRONYMS

ASO	Argonne Site Office (DOE)
ALARA	As Low As Reasonably Achievable
ALD	Associate Laboratory Director
ANL	Argonne National Laboratory
CEMP	Comprehensive Emergency Management Plan
CFO	Chief Financial Officer
CFR	Code of Federal Regulations
COE	Corps of Engineers
COO	Chief Operating Officer
D&D	Decontamination and Decommissioning
DOE	Department of Energy
ECR	Environmental Compliance Representative
EMS	Environmental Management System
EPCRA	Emergency Planning and Community Right to Know Act
EQO	Environment, Safety and Health / Quality Assurance Oversight
EQO-IH	EQO Industrial Hygiene Group
EQO-ECO	EQO-Environmental Compliance Officer
EQO-EMS	EQO Environmental Monitoring and Surveillance Group
EQO-EPC	EQO Environmental Planning and Compliance Group
EQO-TR	EQO Training
EQO-AS	EQO Analytical Services
ERF	Environmental Review Form
ERP	Environmental Remediation Project
ESA	Endangered Species Act
ESH	Environment, Safety and Health
ESH&I	Environment, Safety and Health and Infrastructure
ESH/QA	Environment, Health and Safety / Quality Assurance
ESSH	Environment, Safety, Security, and Health
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FWP	Field Work Proposal
GPE	General Plant Equipment
GPP	General Plant Projects
HEPA	High Efficiency Particulate Air
ISM	Integrated Safety Management
IEPA	Illinois Environmental Protection Agency
JHQ	Job Hazard Questionnaire
LEED	Leadership in Energy and Environmental Design
MELFS	Multi-program Energy Laboratory Facilities Support
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historical Places

ORPS	Occurrence Reporting and Processing System
OSFM	Office of State Fire Marshal (Illinois)
OSHA	Occupational Safety and Health Administration
OTD	Office of the Director
P2	Pollution Prevention
PCB	Polychlorinated Biphenyl
PFS	Plant Facilities and Services
QA	Quality Assurance
QAPP	Quality Assurance Program Plan
RCRA	Resource Conservation and Recovery Act
RSO	Radiation Safety Officer
SER	Site Environmental Report
SME	Subject Matter Expert
SWMU	Solid Waste Management Unit
TMS	Training Management System
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act
UST	Underground Storage Tank
USDA	U. S. Department of Agriculture
USEPA	U. S. Environmental Protection Agency
WMO	Waste Management Operations
WM&PP	Waste Minimization and Pollution Prevention

1.0 INTRODUCTION

This document describes the Argonne National Laboratory (ANL) Environmental Management System (EMS). The EMS is a management tool that describes how ANL consistently monitors and manages the effects its operations or processes may have on the environment and to continually improve its environmental stewardship performance. The EMS is required by DOE Order 450.1 which has been incorporated into The University of Chicago prime contract for the operation of Argonne National Laboratory.

1.1 Scope and Organization of EMS Description

The structure of this EMS description document generally follows the format and approach used in the ANL Integrated Safety Management (ISM) Program Description (www.anl.gov/ISM/guidance) in order to satisfy the requirements of DOE Order 450.1 for integrating the EMS into the ISMS. For additional information on any particular topic in this description, the reader may refer to the same format number in the ISM description. This description specifically demonstrates that ANL's environmental practices satisfy the six components defined in DOE P450.4 and integrates environmental considerations with the ISM description into management and work practices at all levels of the organization.

Overviews of ANL's commitment to environmental concerns, its organization and its document structure are presented in Section 2. Further, Section 2 discusses the vertical and horizontal integration mechanisms in place that ensure a consistent and appropriate application of the environmental program throughout the organization. Section 3 discusses application of the Guiding Principles of ISM. Section 4 discusses the Core Functions as they are implemented within the Laboratory and includes discussions on specific topical areas within the public health and environmental protection program.

1.2 Maintenance of the EMS Description

Safety, Environment and Quality Assurance (EQO) maintains this EMS description so that it reflects ANL's current configuration. This description will be reviewed annually and revised, as necessary, to incorporate changes. Changes may result from reviews, incidents, self-assessments, performance measures, new regulations, program enhancements, etc. This document will be attached to and be considered a part of the *ISM Program Description* which is reviewed by the Environment, Safety, Security and Health (ESSH) Committee, approved by the Laboratory Director and forwarded to DOE for approval.

2.0 MECHANISMS AND RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT

Argonne National Laboratory is a multi-disciplinary research and development organization that is operated by The University of Chicago under contract for the Department of Energy. ANL applies the available resources (people, funding, facilities, etc.) to achieve its research and development missions. ANL personnel are involved in many programmatic and support tasks: they operate facilities (for support, research, and users), conduct bench-, engineering-, and pilot-scale research, maintain the infrastructures at ANL, perform administrative tasks, conduct information and systems analyses, program and complete research in computer science, conduct and oversee construction, and perform off-site work. Funding largely comes from DOE's Office of Science, although other DOE offices and other entities, both governmental and non-governmental, fund a significant fraction of the research at ANL. Facilities are as varied as the projects conducted at ANL: there are high and low hazards, there are complex and simple operations, there are Category 2 and 3 nuclear facilities and laboratories that conduct research on radiological materials, there are industrial-like facilities (e.g., a steam plant) and unique facilities (e.g., accelerators), and there are facilities that ANL operates for outside users as well as facilities operated solely for ANL support services. A more complete description of the activities conducted at ANL can be found in the Argonne Institutional Plan and a brief overview is given in the ISM program description.

ANL operates under the umbrella of ANL policies that include a firm commitment to implement ESH requirements that govern the work at ANL. The ANL organization, while encompassing varied programs and goals, provides an effective means of horizontal communication and control. Further, there is a hierarchy of systems within each organization that allows for effective vertical communication and control that remains inter-related with the other organizations. In addition to a clear, hierarchical line organization of people, ANL has organizational structures for funding, support, and documents. The following sections provide an overview of the organizational structures and mechanisms as they relate to environmental management.

2.1 Commitment to Objective of Environmental Policy

The University Of Chicago Board Of Governors, the Laboratory Directorate, and the Laboratory Management Council are committed to ensuring that environment, safety, and health (ESH) considerations are integrated into the performance of all work. Implicit in this commitment is support to continually improve and maintain an Environment Management System in compliance with the DOE Order 450.1.

The ANL overall policy for Environment, Safety and Health is documented in Chapter 7 of the *ANL Policy Manual* (www.aim.anl/manuals/policy). As part of this policy, ANL has established a detailed environmental policy, Section 7.3 *Environmental Protection Policy* of the *ANL Policy Manual*. This specifies that Argonne National Laboratory will ensure that environmental protection is achieved and activities are conducted according to all federal, state, and local regulations applicable to site activities and to the DOE Orders identified in the prime contract. The environmental protection policy applies to all Argonne National Laboratory

activities that could or do have a potential impact on the environment or on compliance with environmental regulations.

Argonne National Laboratory activities (including experiments, facility operations, construction, and other activities) are to be conducted in an environmentally safe and acceptable manner and consistent with Argonne National Laboratory requirements, federal regulations and environmental permit conditions. In support of the environmental protection policy, Argonne National Laboratory is committed to leadership in environmental management by integrating environmental protection accountability into day-to-day activities and into long-term planning processes.

To support compliance with this commitment, Argonne National Laboratory:

1. Ensures that technologies, facilities, processes, and operating procedures meet or exceed applicable environmental permit expectations and regulatory requirements;
2. Actively explores, creates, and communicates new ways to minimize and prevent pollution arising from all levels of research, development, and operational activities and preserve natural resources;
3. Build partnerships, inside and outside Argonne National Laboratory, to sustain and enhance the environment; and
4. Promptly and responsibly correct conditions to eliminate or minimize potential adverse impacts on sustainable environments.

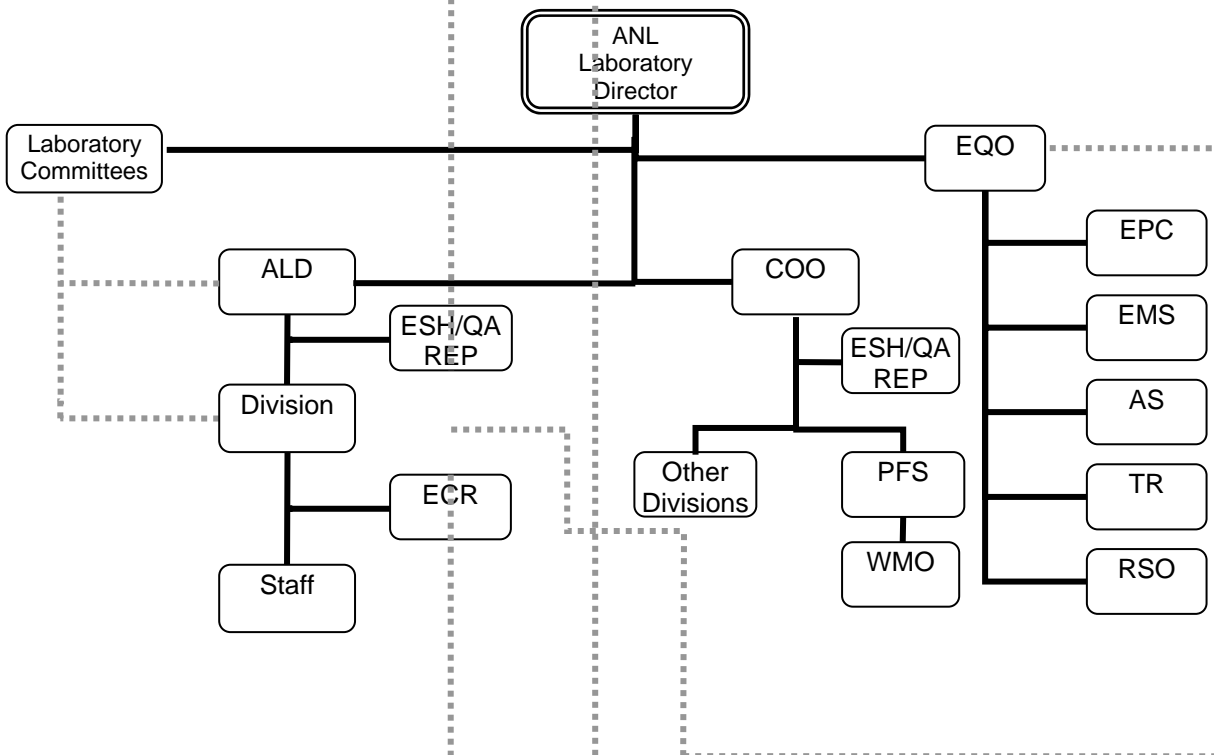
The Argonne National Laboratory Director reviews and approves substantive revisions to the environmental protection policy. The Director, Safety, Environment and Quality Assurance, maintains this policy and reviews it periodically to ensure conformance with current requirements and organizational conditions. To facilitate the implementation of this policy, all laboratory employees are required to undergo the Pollution Prevention Training Course, ESH 112, to increase their awareness and which includes the important aspects of the Laboratory's environmental policy. Objectives and targets are developed annually to track and improve environmental conditions and the quality with which commitments are met (see section 4.3).

2.2 Environmental Organization Structure and Roles

The roles and responsibilities in implementing EMS flow from the DOE to The University of Chicago, to the ANL Laboratory Director, the Laboratory Directorate and Management Council, to the individual Associate Laboratory Directors and Chief Operations Officer, to the Division Directors, and to the ANL workers along the line management structure. The ANL Organization Chart (www.ipd.anl.gov/anl_org_chart) is found in the ANL *Policy Manual* Chapter 9, *Organization*. The details of the line management organization are found in section 2.2.1 of the *ISM Description Document*. The flow of environmental responsibilities follows this same process. The environmental organization chart is shown below in Figure 2.1. Figure 2.1 shows that the line organizations are directly responsible to the Laboratory Director for implementing environmental programs, while the EQO organization provides direct line

responsibility to the Laboratory Director for environmental oversight of the program and program monitoring and assistance to the line. The Chief Operations Officer has direct line responsibility to the Laboratory Director for collecting, consolidating, and shipping of all waste and for providing these services to support the other line organizations. Committees have also been appointed to provide environmental support to the line organization. These responsibilities are discussed in more detail below in section 2.2.1 and 2.2.2.

Figure 2.1 ANL Environmental Organization



2.2.1 Environmental Structure In Line Organizations

The line organization appoints a number of individuals with environmental responsibilities to provide advice and guidance to them. Each ALD/COO is supported by an ESH/QA Representative. The environmental responsibilities of the ESH/QA Representative include most or all of the following: interfaces with Division ESH/QA Coordinators on environmental issues; interfaces with EQO on environmental issues; serves as a participant and point of contact for assessments; and maintains cognizance of ALD/COO activities in order to ensure environmental protection support when needed. Each ALD/COO also appoints a NEPA

Owner to oversee and implement the NEPA program in their area of responsibility including ensuring that the *Environmental Review Form* has been generated and to transmit those forms to the NEPA Reviewer. In most cases this is the ESH/QA Representative.

Division/Department Environmental Compliance Representatives (ECR) are appointed by and report to the organization management and serve as the primary point of contact on matters related to environmental protection. The ECR specific duties include the following:

- ensures Division operations have all the necessary environmental permits and comply with permit conditions, including the tracking of expiration dates;
- works in conjunction with Division personnel and NEPA Owners to ensure preparation of quality NEPA documents;
- ensures that experiment reviews include environmental protection considerations;
- requests effluent monitoring or incremental surveillance when needed;
- assesses Divisional operations to ensure that they are being conducted in a manner protective of human health and the environment, and comply with applicable regulations;
- serves as the point of contact for environmental audits and compliance assessments within the Division; and
- acts as the custodian for the Division's repository for environmental records.

Other Division staff also assists the line in maintaining a safe environment, such as the ESH Coordinators, who act as the principal contact to Laboratory organizations with ESH Subject Matter Experts and the ALD/COO ESH Representatives (as described in Chapter 1.1 of the *ESH Manual*, www.aim.anl.gov/manuals/eshman). Health Physicists and Health Physics Technicians, who monitor radiation levels and provide radiation support (as described in Chapter 5 of the *ESH Manual*), and the Quality Assurance Representatives, who monitor quality assurance aspects and provide support in quality assurance areas (these responsibilities are fully described in the *Quality Assurance Program Plan*, www.aim.anl.gov/manuals/qapp).

2.2.2 Environmental Support

There are several organizations that provide matrix support to the line organizations. These are shown in Figure 2.2 and their functions are detailed below.

2.2.2.1 EQO (See also www.anl.gov/EQO/)

2.2.2.1.1 Environmental Compliance

Several components of the EQO organization provide support to the line organizations. The EQO-Environmental Compliance Officer (EQO-ECO) is appointed by and reports to the Director of EQO. The EQO-ECO provides oversight of programmatic and support activities that ensure compliance with federal, state and local environmental protection laws, regulations, and DOE orders. The EQO-ECO serves as the primary interface between ANL and DOE/regulatory agencies on nonroutine environmental issues such as compliance inquiry letters and Notices of Violation. The EQO-ECO is also responsible for coordinating the preparation and transmittal of correspondence establishing the ANL policies on environmental issues. The

EQO-ECO also holds periodic informational and instructional meetings with the ECRs and responds to requests from line management to provide technical support in addressing routine environmental protection issues. The NEPA Reviewer for the Laboratory also reports to the Director of EQO and serves as the point of contact with the ALD/COO NEPA Owners and with DOE for all NEPA activities at the Laboratory. More details on the NEPA program and the EQO-ECO can be found in Chapter 10 of the *ESH Manual* (www.aim.anl.gov/manuals).

The EQO Environmental Planning and Compliance (EQO-EPC) group serves as the primary support organization dealing with the implementation of environmental regulations. The staff is knowledgeable in federal, state, and local regulations and DOE orders. Responsibilities include; provide expert assistance, supported by the ANL Legal Department, in the planning, design, implementation, and permitting of operations to ensure that the environmental requirements are met; provide prompt reporting to management and regulators of any noncompliances; develop and administer the ANL NEPA program; administer, review and consult on the permitting process; technical resource on environmental issues/regulations; conduct environmental reviews of projects; conduct compliance assessments for major program areas; maintain an environmental compliance web site; and support the EQO-ECO's oversight role by participating in audits.

2.2.2.1.2 Environmental Monitoring and Surveillance

The EQO Environmental Monitoring and Surveillance (EQO-EMS) group is responsible for monitoring the effects, if any, of ANL activities on the public and the environment. Environmental monitoring consists of two major activities, effluent monitoring and environmental surveillance. Effluent monitoring includes collecting and analyzing samples or measuring liquid and gaseous releases for the purpose of characterizing and quantifying contaminants, assessing radiation exposure to the public, providing information used to control effluent releases at or near the point of discharge, and demonstrating compliance with applicable standards and permit conditions. Environmental surveillance includes collecting and analyzing samples or direct measuring of air, surface water, groundwater, and sediment from the ANL site and its environs; assessing radiation exposure of members of the public and assessing the effects, if any, on the local environment. The information generated by the monitoring program is the basis for reports to various federal and state agencies to satisfy permit and regulatory requirements, and are summarized each year in the *ANL-E Site Environmental Report*, www.anl.gov/ESH/anlser.

The operating philosophy of the monitoring program is to maintain a program that characterizes any radiological and hazardous chemical releases so as to determine the extent and magnitude of the impact. Part of this program is to conduct permit and regulatory driven requirements and to report these results to the appropriate regulatory agency within the stated timeframe. All radiological releases are monitored or estimated and the dose to the environment and the public is estimated, including doses to populations. The biota dose assessment is discussed in section 4.2.14. All monitoring activities are integrated into the monitoring program to avoid duplication and produce efficiencies over separate organizations. All environmental

data is maintained in a single data base. The rationale for monitoring is described in the ANL Environmental Monitoring Plan

2.2.2.1.3 Analytical Support

The EQO Analytical Services (EQO-AS) group is responsible for providing radiological and chemical analysis to support the environmental monitoring, bioassay, industrial hygiene, and the health physics programs. This dedicated onsite laboratory provides quality analytical data needed by programs to satisfy their regulatory and internal needs. The analytical program supported by a rigorous quality assurance program, including participation in environmental quality control programs and is accredited by DOLAP and the American Industrial Hygiene Association.

The EQO-AS laboratory maintains a set of approved procedures which allows consistency in the analytical method application, calculations, and data management. The high quality results of EQO-AS's participation in the DOE-EML-QAP program demonstrates the ability to generate quality data.

2.2.2.1.4 Training

The EQO-Training group is responsible for administering the Training Management System (TMS) which is used to determine the training needs of each worker based on the worker's responsibilities/activities and the hazards each employee may encounter in the workplace. Required training is identified by a Job Hazards Questioner form that is completed by every employee and is reviewed by each employee's supervisor. Environmental related courses such as waste generation, waste handling, specific hazard training, etc. are coordinated by the Training Group to assure that the training is appropriate for the audience, meets all regulatory requirements, is given to those who need it, and has the appropriate schedule and content. Environmental protection training courses and course descriptions are listed in the Training Course Catalog.

A training course has been developed, ESH-300, that describes EMS requirements covered by Executive Order 13148, DOE Order 450.1 and the ANL EMS program. This course is required for ECRs, ESH coordinators, NEPA owners, and all managers. It is suggested for all employees. This base course, augmented by special topic training such as the Pollution Prevention Training, should allow individuals to identify activities with significant environmental impacts, assess performance, and implement corrective actions where needed.

2.2.2.1.5 Other EQO Support

Other EQO support include the Industrial Hygiene (IH) group which is responsible for providing industrial hygiene assistance and monitoring including activities such as indoor monitoring for potential hazardous environments, in-place HEPA filter testing, respiratory protection assistance, assistance with chemical spills; and the Radiation Safety Officer (RSO) who is responsible for providing advice and assistance to all laboratory organizations in the safe handling of and protection from radiological materials.

2.2.2.2 Other Support Organizations

2.2.2.2.1 Waste Management Operations

The PFS-Waste Management Operations (WMO) is responsible for the safe collection, treatment, storage and disposal of all regulated waste generated at ANL. This includes hazardous waste, special waste, low-level radioactive waste, mixed waste, and transuranic waste. ANL does not generate or handle any high-level radioactive waste. WMO is also responsible for compliance with the RCRA Part B permit, the DOE requirements for radioactive waste management, and all other applicable regulations.

2.2.2.2.2 Fire Department

The SCD Fire Department provides primary support in the handling of environmental emergencies such as response to hazardous material spills and specialized training in spill prevention and cleanup.

2.2.2.2.3 Emergency Management

The SCD-Emergency Management group is responsible for maintaining the requirements of the *Comprehensive Emergency Management Plan (CEMP)*. The *CEMP*, which is an ANL Tier 2 document, augmented by formalized assessments, identifies potential environmental concerns and impacts as issues resulting in or contributing to operational emergencies as defined in DOE Order 151.1A. This process involves the development of procedures to cover the response to various emergencies; identifying and training staff to carry out various duties during an emergency; establishing primary and backup locations to manage the response to an emergency; and establishing a communication system. These systems and procedures are tested regularly to demonstrate that the emergency program is capable of maintaining continuous, effective, and accurate communications among response components and organizations. Documents supporting the CEMP include a *Spill Prevention Control and Countermeasures Plan*, a *RCRA Contingency Plan*, and other regulated or permitted emergency requirements that apply to environmental incidents.

2.2.2.3 Committees

Identification, implementation and conformance with environmental regulations/requirements are also assisted through Lab-wide and Division-level committees. The members of committees come from various ANL organizations, and the representation allows for development of processes and procedures that are appropriate for ANL environmental concerns and can be applied across the diverse ANL organizations. The Environment, Safety, Security and Health (ESS&H) Committee, chaired by a Deputy Laboratory Director, is the Laboratory's highest level forum for directing environmental performance, improvements, and accountability. This committee reports to the Laboratory Director. Other committees whose charters include strong environmental aspects include the Waste Minimization and Pollution Prevention Advisory Committee, the ALARA Committee, and the Land Management and Habitat Restoration Committee. A complete listing of the ANL Lab-wide committees and their charters is given in the *Laboratory Committees Manual*.

2.2.3 Funding Structure

Funding for environmental activities at ANL comes from various sources and through various paths. ANL receives funding to conduct research; operate facilities; conduct environment restoration projects, including decontamination and decommissioning (D&D) activities; and perform infrastructure maintenance and upgrades. Sponsors provide support for individual programs and project and facility operations. The funding does not necessarily flow down through the line organization that was discussed in Section 2.2.1. The Laboratory, Associate Laboratory Directorates, and Divisions tax all funding to support the common operations at the various organizational levels. However, the same Laboratory environmental policies and processes apply to all activities regardless of funding source, because consideration of potential environmental impacts is institutionalized in the NEPA process. The most important environmental funding sources are discussed below.

Direct Funding

Funds are released to Divisions either to operating expenses directly or to a *Work Project Authorization Form* for project costs. This direct funding would be used to cover the cost of a project's environmental documentation and any project features to reduce potential environmental impact. At the Division or Program level, assessments from this direct funding also cover the overhead expenses including the environmental aspects of managing the programmatic Divisions (e.g., the Division's ECRs, portions of the Pollution Prevention (P2) Program), and to correct smaller cost environmental concerns that are immediate or can easily be handled at that level. This Division overhead is then used to cover the cost of Laboratory support functions under direct allocations, although there are situations in which the direct ANL's research missions are charged to a specific cost-code (i.e., a Field Work Proposal (FWP) program).

Indirect Funding

Because direct funds are for specific programs, ANL has an indirect rate structure (overhead) that assesses the direct-funded programs to pay for Lab-wide operating expenses, including environmental support functions. The Environmental Groups within EQO are a budgeted based on the anticipated environmental support and oversight needs of the Laboratory. This budget is then rolled up into an EQO budget which in turn is part of the Office of the Director (OTD) budget. The EQO budget includes the environmental subject matter experts within that group, and the sites environmental monitoring, compliance, surveillance and oversight aspects. The OTD budget can also be a source of funding for environmental needs that are not covered at the Division level or through capital funding. It also covers most of the COO Divisions including those PFS Groups that are not direct funded.

Line Item, General Plant Projects (GPP)/General Plant Equipment (GPE) and Multi-program Energy Laboratory Facilities Support (MELFS)

DOE also provides capital funding to address some ESH and infrastructure needs at ANL. This latter funding comes as GPP, GPE, MELFS, and construction (line item) funds. Major environmental projects (e.g., Environmental Restoration Projects such as Remedial Action Projects and Decontamination and Decommissioning Projects) are typically planned and proposed as line items or under DOE baseline funding. Smaller construction projects are typically funded by GPP. GPE is used for equipment to be used on a lab-wide basis.

Programmatic equipment is typically requested as part of the FWP. Funds for equipment are assessed to cover a portion of the ANL indirect expenses, as well.

Funding Environmental Deficiencies

Environmental deficiencies are identified by various means including such things as the safety walkthroughs by line management, maintenance issues noted by PFS, items noted and reported by line staff. Line management addresses environmental deficiencies of immediate concern using operating and/or capital funds. Those deficiencies not immediately corrected as part of normal operations are documented and corrective actions are tracked in the EQO tracking system or by line management.

For those environmental deficiencies requiring significant funding that are not funded by GPP/GPE, indirect tax or operating funds, line management will list the deficiencies as part of the ANL *Environment, Safety and Health and Infrastructure (ESH&I) Management Plan* prioritization process. Available funds are then allocated for correcting these deficiencies based on a prioritization process and consistent with DOE requirements. During the year as unanticipated needs are identified, the COO may reallocate funding to address pressing issues.

2.3 Policies, Processes and Requirements Documentation

2.3.1 Document Hierarchy

The Environmental Management System is supported by a number of documents, guides, reports, and manuals. The compendium of ANL documentation is separated into three tiers. The top tier (Tier 1) documents policies that include the environmental policy. The second tier (Tier 2) documents further define the policies and provide lab-wide processes and procedures to implement the policies, such as the *ESH Manual*. The third tier (Tier 3) documents include the Division-specific policies, processes, procedures, records, and other activity-specific documents. The Tier 1 and the majority of the Tier 2 documents are available through the ANL intranet (www.aim.anl.gov/anlresources) and the on-line version is the controlled document.

Existing documents provide detailed information that supports the EMS. The Environmental Protection Policy Chapter 7.3 in the ANL *Policy Manual* documents the overall policy for the Laboratory. Environmental requirements are given in Tier 2 documents and permits from the State and Federal Government. Many of these requirements are listed in Chapter 10 - Environmental Protection - of the *ESH Manual* referenced in the appendix of the *ANL Site Environmental Report* (www.anl.gov/ESH/anleser) or listed in the *ISM Program Description* Table 2-1. Other documents include those that define the roles and responsibilities for ensuring compliance with the regulations. Typically specific duties are collected within individual position descriptions. Still other documents define the environmental hazards associated with facility operations and how they will be regulated and mitigated such as Safety Evaluation Reports or Documented Safety Analyses which are reviewed on an annual basis. All documents that could impact the EMS are reviewed on a periodic basis to assure that any changes in the documents are reflected in changes in the EMS. Examples of mechanisms used to remain current with changes include periodic review and revision requirements, lessons-learned

reports, interactions with other DOE sites, participation in informal/formal forums (topical conferences), assessments by stakeholders, and others. All feedback mechanisms are used to improve the documentation of requirements (See Section 4.1.5).

2.3.2 Incorporation of New Environmental Requirements

The *ANL Policy Manual* Chapter 6.18 *DOE Directives Processing Policy* defines the procedure for processing environmental draft and final DOE Orders or other directives and incorporating them into the documentation hierarchy. Subject Matter Experts (SME) prepare changes to environmental requirements or procedures in manuals such as the *ESH Manual* and then broad-based committees of subject matter experts and representatives of organizational units affected by the changes review them. Legal also monitors the Federal Register for changes that could impact the Laboratory.

In addition to new or revised DOE Orders and Regulations, which prescribe requirements, ANL uses other sources to identify opportunities for environmental improvement. These include lessons-learned reports, interactions with other DOE sites, participation in informal/formal forums (e.g., topical conferences), ORPS reports, assessments by stakeholders, and feedback from public interest groups and others.

EQO-EPC subscribes to the codes of state and federal regulations, and as new regulations come out, they are reviewed to ensure ANL programs still meet the regulations in all the environmental and other safety areas. This group also receives numerous environmental publications and attends environmental conferences and meetings where impending or expected changes to requirements are discussed. If new regulations require changes to environmental permits, these are made with the state at the time the existing permit is up for renewal.

2.3.3 Vertical Integration of Environmental Requirements and Feedback

DOE provides direction through The University of Chicago contract (www.contract.anl.gov), which provides a listing of the DOE Orders/requirements that apply to the Laboratory. The requirements are codified in the Tier 1 Policy and Tier 2 documents, as appropriate, and those policies and requirements are used as the basis for training provided to employees and others conducting work at ANL. Requirements are communicated through training, the Tier 2 documents, the applicable permits and the Tier 3 Division policies and procedures. This vertical flow is shown in Figure 2-3 of the *ISM Description Document* as well as in Figure 4.2 of this *Environmental Management System Description Document*.

As discussed in Section 2.2, ANL has established an organizational structure that has integrated environmental management into all aspects of its functions. Clear lines of authority have been established along with appropriate policies and procedures to carry out the ANL environmental management program policy, objectives, and targets. Independent oversight of the environmental management program occurs through the EQO oversight function as a means of assuring ANL upper management that the EMS is being implemented as planned and required.

Feedback and continuous improvement encompasses several processes including establishing performance measures with associated goals and metrics. These mechanisms are discussed in section 4.1.5

2.3.4 Vertical Communication to External Parties

ANL communication with the regulatory agencies and the public includes both those that are required by regulation and those that are voluntary. Interaction with regulatory agencies is illustrated in Figure 4.2 of this document. For example, in some cases, changes of state-issued permits require public hearings or notices to the public of permit changes. Violation of regulations, laws, or permit conditions requires notification of the appropriate agency. Violations require some type of corrective action commitment to the agency to address the violation including follow up reporting.

Most non-regulatory driven communication by ANL is coordinated through the ANL Office of Communications and Public Affairs which is responsible for press releases, internal publications (such as the Argonne News), speakers' bureau, and interface with the public and community organizations. The public affairs policy is found in the ANL *Policy Manual* Chapter 6.27 and the activities and means of interfacing with the public are defined in the ANL *Public Affairs Plan*. ANL also recognizes the need to keep the public informed during emergency situations and has developed a *Public Affairs Emergency Procedure* for doing this. An example of the community outreach activities include the Community Leaders Roundtable which meets regularly with ANL management and is provided presentations on various aspects of the ANL programs and operations including environmental issues, progress, and management. Other voluntary communication typically involves phone calls, emails, and occasionally meetings to discuss progress and issues on regulatory and technical requirements and address the community advice aspects of the "Greening the Government" Executive Orders. In the past, voluntary public meeting have been conducted to share with the public progress on the environmental remediation program.

The public ANL web-site at www.anl.gov/OPA/pubint.htm includes a great deal of information on environmental programs at ANL such as the annual *ANL Site Environmental Report* and fact sheets on environmental monitoring and waste handling. More specific information on the ANL ISM program (of which this EMS is a component) and further discussions concerning the ANL environmental programs and Executive Order 13148 can be found on internal web-sites at www.anl.gov/ESH, which is managed by the EQO organization. Collectively, these activities communicate environmental management activities to the ANL community, the regulators, and the public.

2.4 Horizontal Environmental Integration

The structures and documentation described in the previous two sections provide checks and balances to ensure the appropriate requirements are implemented at all levels of the Laboratory. This flow down allows for implementation of the environmental requirements to the specific environmental concerns that are consistent across the Divisions. Such things as the NEPA program and the various permit requirements specify the way in which these environmental program aspects are to be handled at all Division levels. Support and oversight organizations play a pivotal role in ensuring a consistent application of environmental requirements.

The mechanisms of feedback used to promote horizontal environmental integration are numerous and varied as illustrated by Figure 4.2 of this document. These may include such things as periodic ECR meetings led by members of EQO-EPC, Management Council meetings, Division Director memos and luncheons, EQO reviews, EQO environmental monitoring programs, Division meetings, Division safety committee meetings, self-assessments, management assessments, participation on Lab committees, environmental reports, ANL newsletters, accident/incident investigations, experiment safety reviews, employee stop work policy, Division walkthroughs, etc.

3.0 GUIDING PRINCIPLES

For each of the guiding principles in the ISM policy, the sections below provide a short discussion of the mechanisms at ANL used for implementation of environmental program components. For a more comprehensive discussion, see the ISM description document.

3.1 Line Management Responsible for Environmental Management/Protection

In accordance with the ANL Policy on Environmental Protection (Chapter 7, Section 7.3 of the *ANL Policy Manual*), environmental protection is a line management responsibility that is a standard part of all experiments, projects, operations, and activities. The lines of responsibility follow the lines of authority discussed in Section 2.2.1; the Laboratory Director is responsible overall for the implementation of the environmental policy at ANL. The *ANL ESH Manual* Chapter 10-1 also indicates that environmental protection is a line management responsibility that accrues to the programmatic or support organization at the same time that responsibility for a project or operation is assigned.

In addition, all individuals who perform work at ANL have the authority and responsibility to “stop the work” when they observe or are involved in an unsafe activity or working conditions that could cause significant harm to the environment. The responsibility for integrating environmental considerations and stopping unsafe work extends to contractors, guest researchers, facility users, students, and visitors. This authority is established in Section 7.3.1 of the *ANL Policy Manual*.

3.2 Clear Roles and Responsibilities

The lines of authority and responsibility for environmental aspects of work are clearly defined by the ANL organizational structure, which was summarized in Section 2.2.1. Section 4.2 of this document also identifies the roles and responsibilities of line management organizations and environmental support organizations for the management of ANL environmental programs. The *ANL Policy Manual*, Chapter 7, *Health, Safety, and Environmental Protection* and Chapter 7.3, *Environmental Protection Policy*, specifies the roles related to environmental protection. Specific responsibilities are documented in the Tier 2 and Tier 3 documents discussed in Section 2.3.

Other specific ANL *Policy Manual* sections that define roles and responsibilities for implementing environmental program aspects include Chapter 4 Part 4.1, *Construction Project Management*, Chapter 6 Parts 6.5, *Preparation, Submission, and Approval of Work-for-Others Proposals*, 6.13 & 6.14, *Hazardous Materials Packaging & Transportation*, Chapter 8 Part 8.1, *Human Resources*, Chapter 11 Part 11.2, *Operation and Maintenance of ANL Buildings and Facilities*. The ANL *ESH Manual* Chapters 1-1 and 10-1 and Part 2 of the ANL *Quality Assurance Program Plan* also define the basic assignment of environmental roles and responsibilities.

3.3 Competence Commensurate with Responsibility

Assuring competence at ANL is the goal of the hiring process that is defined in *HR Policy and Procedures Manual* Chapters 2200.1 and 2200.2 at (www.aim.anl.gov/manuals/hrppm). It begins with the selection process for an individual position. For environmental positions, such as the EQO-ECO, a position description is prepared and an individual is hired with the appropriate environmental background to satisfy the requirements of the position description.

Based on the position description and the hazards associated with the job to be performed, a Job Hazard Questionnaire (JHQ), a part of the ANL Training Management System (TMS), is completed and determines an individual's environmental training requirements by identifying an employee's responsibilities and potential for hazard exposure. Training of individuals for specific hazardous operations and the procedures used in that operation ongoing in a facility is the responsibility of the Division in which the operation takes place.

EQO Training coordinates environmental training in the processes and requirements that have application Laboratory wide. For example, all ANL personnel must take course ESH 112, which is Pollution Prevention Awareness training and all workers that generate or handle waste, ECRs and NEPA reviewers must take training courses in performing their jobs safely and protecting the environment. Examples of environmental courses provided by EQO Training are the 40-Hour Hazardous Waste Operations training (as well as the refresher and a course for supervisors), Pollution Prevention, Chemical Waste Generator training, Radiological Waste Generator training, NEPA training, Hazard Communication, and Packaging Requirements for Hazardous Materials. Training for handling certain specific hazards such as cryogenics, lead, asbestos, beryllium, etc. that may be found in several places at the laboratory are also provided by the EQO Training group and are given to those who will be working in or around those places. New courses are developed as needed. When a new course is required, the appropriate SME develops or provides input on the content. The listing of current courses available may be found at www.eshtesting.anl.gov.

The Subject Matter Experts in the EQO and PFS support organizations are hired as professional staff based on education and experience. In addition, these Subject Matter Experts are expected to maintain and upgrade their competency through gaining additional experience working on site, discussions and interactions with other environmental staff, continuing education, training, attendance at environmental meetings and reading the latest environmental

studies and regulations. Subject Matter Experts are also encouraged by ANL management to join and participate in relevant professional societies.

3.4 Balanced Priorities

ANL must operate within the constraints defined by the available funding and resources. ANL activities are funded through mechanisms discussed in Section 2.2.3. The responsibility and authority for integrating environmental considerations into work planning and conduct is clearly established within line management. Line management uses a graded approach in applying environmental requirements that is based on the risk that an activity presents to the environment and the quality of the activity itself. Therefore, ensuring that environmental considerations are given priority, as described in the *ANL Policy Manual* Chapter 7, *Health, Safety, and Environmental Protection*, is part of the role of line management. The process of determining the appropriate balance for the activity is implemented at all levels of ANL through work planning including the NEPA process. The NEPA process evaluates potential environmental impacts and provides a basis for identifying mitigating actions to decrease the environmental impact or best assure regulatory compliance for individual projects. Oversight by line supervisors, support groups, oversight organizations, and committees provides feedback on the planning and facilitates implementation of the appropriate balance. In total, the mechanisms mentioned help ensure that individuals are not placed in a position that compromises environmental protection or regulatory compliance for schedule, financial, or technical considerations.

ESH Manual, Chapters 1-1 and 10-1 state that the Laboratory Director is responsible for providing resources to implement the environmental programs, and line management is given the responsibility of supporting the environmental program and appointing appropriate personnel to implement it.

3.5 Identification of Environmental Standards, Requirements, and Goals

The process for applying standards and requirements at ANL are described in Section 2.3. The requirements flow down from DOE Orders, Illinois Environmental Protection Agency (IEPA) permits, U.S. Environmental Protection Agency (USEPA) and OSHA regulations, other regulations and good practices identified from various external sources. Section 4.2 of this document summarizes requirements for the management of ANL environmental programs. The *ESH Manual* Chapter 10 defines the environmental standards and requirements applicable at ANL. They address known hazards associated with activities at the Laboratory and capture not only DOE directives but also federal, state, and local regulations. For many environmental activities, the requirements are defined in environmental permits issued by IEPA. The latest environmental permit requirements can be found at www.anl.gov/EQO/epc.

Line management is responsible for determining the applicability and application of the requirements to a specific activity. The support mechanisms and organizational structures discussed in Section 2.2 of this document assist line management in making the determination and provide the checks and balances to assure appropriate application.

The specific ANL *Policy Manual* (www.aim.anl.gov/manuals/policy) sections that relate to identification of standards and requirements include Chapter 7, *Health, Safety, and Environmental Protection*, Chapter 8 Part 8.1, *Human Resources*, Chapter 11 Part 11.2, *Operation and Maintenance of ANL Buildings and Facilities*, and Chapter 12, *Quality Assurance*.

3.6 Hazard Controls Tailored to Work Being Performed

Hazards are identified through NEPA reviews and the documents and responsibilities discussed in Sections 2.2 and 2.3. The level of formality used to identify the hazards is commensurate with the risk of the activity. Similarly, the mechanisms discussed in Section 2.2 and 2.3 are used to identify and develop appropriate controls for the identified hazards. Implementation of environmental controls is evaluated through the NEPA process as well as environmental monitoring programs and management and independent assessments.

Specific ANL *Policy Manual* sections that discuss hazard controls and related responsibilities include Chapter 4 Part 4.1, *Construction Project Management*, Chapter 6 Parts 6.13 & 6.14, *Hazardous Materials Packaging & Transportation*, Chapter 7, *Health, Safety, and Environmental Protection*, and Chapter 12, *Quality Assurance*.

3.7 Operations Authorization

Overall, ANL is authorized to operate by the contract between the DOE and The University of Chicago. New projects and research activities are authorized through the NEPA determination. Authorizations also come from external regulatory agencies through environmental permits and approved work plans.

The responsible line manager authorizes work at ANL. The conditions and requirements for work authorization are determined by use of the processes discussed in Section 2.3 and in relation to the other Guiding Principles in Sections 3.1 to 3.6 above. The formality of the authorization (i.e., the specific method used) is graded based on the risk of the activity. Higher risk activities require more formal reviews and higher-level authorizations; the processes for specific activity authorizations are discussed in the appropriate Tier 2 and 3 documents. For example, NEPA Owners are authorized to approve projects that conform with a set of conditions defined as indoor, bench scale research that do not require modification of environmental permits, while outdoor modifications, activities that require permit modifications, and major construction projects require a higher level of review.

While the overall approval process defined above is used for authorizing operation, the primary mechanism used for environmental approvals (which is encompassed within the overall process) is the NEPA process. The DOE approves NEPA documents and authorizes designated ANL personnel to determine that certain activities are covered by DOE categorical exclusion determinations, as described in *ESH Manual* Chapters 10-2. Some activities may require specific environmental permits or revisions to permits, and the processes for these permits are documented in *ANL ESH Manual* Chapters 10-1, 3, 4, 6 and 13.

4.0 CORE FUNCTIONS

The five core functions documented in the ISM policy describe a cycle that reasonably represents how work is performed taking into account the affected environmental, safety and health aspects by the line organizations. The first three core functions constitute work planning and the last two address work conduct and feedback. The first part of Section 4.1 discusses how these core functions are utilized for systematic planning of programs for environmental protection with special emphasis on pollution prevention. Section 4.2 describes the ANL environmental programs that are pertinent to the operations of the Laboratory.

4.1 Core Functions As Applied to ANL Environmental Management

4.1.1 Define the Scope of Work

The *Institutional Plan* outlines the development of both research programs and support organizations in the context of the DOE and ANL, and expected resource constraints. The *Institutional Plan* is the culmination of an annual planning cycle and reflects the highest level of the programmatic planning process including summarizing those ESH&I Plans that have been rolled up to this highest level.

At the work activity level, the scope of work is approved with an approved work statement and budget authorization. The statement of work is redefined as a set of serial and parallel activities and tasks. For experiments, each ANL Division must use a process in accordance with the *ESH Manual* Chapter 21-2. In preparation for the review, the experimenter prepares documentation that defines the scope and purpose of the experiment. The documents may include the NEPA Environmental Review Form (ERF) and supporting documentations which give narrative descriptions of environmental hazards and hazards controls, as well as work plans, equipment designs, operating procedures; etc. The ERF is the critical document to identify any environmental aspects and to plan for the need for environmental permits, studies, or restrictions. For construction and service work, the scope of work is normally defined in a Work or Service Request. An assigned Project Manager prepares or assures that documentation is prepared to define the work, the hazards and hazard controls including the ERF, work plans, equipment designs, procedures to be followed, etc. This and the review process to be used for construction/service contracts are found in the *ANL Manual of Construction-Section 33* (www.aim.anl.gov/manuals/const). For operating facilities, the overall work scope is found in the annual Field Work Proposal. The documentation for operating facilities is prepared by the facility manager and may include such things as a safety analysis document, operating procedures, State issued air/water permits, etc. Facility operations are reviewed in accordance with their hazard potential and can range from DOE review and approval to Division Director approval with occupancy permits.

4.1.2 Analyze the Hazards (Environmental Impacts)

The documentation required for the various work activities at ANL discussed above also contain analyses of the hazards or environmental impacts related to building and/or operating the facility or experiment. These documents cover normal operations as well as anticipated off-normal conditions. If an environmental permit is required for a given activity, the permit will also document the hazards present. Potential environmental impacts are given in the

Documented Safety Analyses required for operations with potential hazards. Examples of these include those for nuclear facilities (see the *ANL Nuclear Safety Procedures Manual*), accelerator facilities (see the *ANL Accelerator Safety Procedures Manual*), and experiments (see the *ANL ESH Manual*, Chapter 21). All activities are analyzed for environmental impacts using the NEPA process defined in the *ESH Manual*, Chapter 10.2 and document the NEPA determinations in a *Categorical Exclusion*, *Environmental Assessment* or an *Environmental Impact Statement*.

4.1.3 Develop and Implement Controls for Environmental Impacts

The documents and permits mentioned in the previous sections demonstrate the controls necessary to perform the work with the appropriate environmental considerations. A defense in depth philosophy with different levels of protection is taken to control environmental hazards. The approach includes a combination of engineering and administrative controls. Examples of engineering controls are HEPA filters, automatic shutoffs if measured parameters are exceeded, containments, etc. Examples of administrative controls are requirements manuals and documents (See section 2.3.1), operating procedures, change reviews, etc. Implementation of the controls is assured through use of appropriately qualified workers, equipment testing and inspection programs, management walk-throughs and inspections, audits, the use of subject matter experts in the control's development, installation and testing, operating records, the EQO environmental monitoring programs, and ensuring permit conditions are maintained.

4.1.4 Perform the Work Within Controls

The work is performed in accordance with the documented NEPA determinations, safety analyses and within permit stipulations. Work is not to proceed unless the appropriate environmental controls are in place, have been previously reviewed by subject matter experts, and the operation stays within the boundaries defined in those documents. If conditions change such that the activity is deemed detrimental to the environment, is no longer in compliance with regulations or some new environmental impact is noted that was not previously considered, the workers are to stop the work and evaluate the appropriate prerequisites, i.e. NEPA, safety and regulatory reviews, before continuing the activity.

4.1.5 Provide Feedback and Continuous Improvement

As previously noted in Section 2.3.3, there are numerous mechanisms to provide feedback on environmental activities. At the working level, this feedback flow is the reverse of that described in the vertical integration Section 2.3.3 in that the worker provides the supervisor with feedback through stopping the work, direct communication, documenting an issue or improvement suggestion by any of a number of avenues such as on the work request form or through e-mail. The NEPA process provides feedback at various levels of review. This feedback goes up the management chain until the appropriate level is reached to address the issue. This may be at the supervisor level or if impacting the site, all the way to the Laboratory Director. Feedback and suggestions for improvement can also come from ECR meetings, environmental monitoring and reporting systems, community outreach programs, occurrence reporting and corrective action systems, self and management assessment programs, emergency preparedness drills and reviews, laboratory committees, pollution prevention programs, long term stewardship activities, external audits and inspections by DOE or EPA, etc.

Other processes used to drive continuous improvement are establishment of environmental goals and performance metrics that are determined and tracked as part of an annual review required by the performance based contract with DOE. These goals and how they are to be measured are jointly determined at the beginning of the year between ANL and DOE and incorporated into Appendix B of the contract. These goals are tracked throughout the year and ANL performance is then judged by DOE based on the degree of successful completion of these goals. This process and the latest goals can be found on www.ipd.anl.gov/cpmr.

In addition to these DOE performance measure goals, ANL maintains other environmental goals including the EMS objectives and targets. Examples include the ANL commitments to waste minimization and pollution prevention identified in the *ANL Pollution Prevention Program Plan*, conducting environmental audits to assess performance, site cleanup of radioactive materials including decommissioning and decontamination (D&D) of contaminated facilities, Toxic Release Inventory (TRI) reporting and others including this EMS found in DOE Order 450.1, captures the goals and requirements from Executive Order 13148. Another example is the reporting goals in DOE Order 231.1A. In addition to these formal goals, ANL has vision statements that are related to continuous improvement, such as the effort to be in compliance with all proposed NPDES permit conditions before the permit is issued.

Some of the more key feedback and improvement processes are discussed below:

Environmental Monitoring and Reporting

A key element of feedback and continuous improvement as well as assuring controls are in place and being correctly applied is to consistently monitor environmental releases to determine compliance with applicable regulations and permit conditions and to provide a framework for ANL to systematically identify and reduce detrimental impacts to the environment.

The *ANL Environmental Monitoring Plan* (www.anl.gov/ESH/ems/ems_program) describes the rationale for the site's environmental monitoring program including the extent and frequency of monitoring and measurements, laboratory analytical procedures, quality assurance, program implementation, and report preparation. The plan is reviewed annually and revised every three years. EQO-EMS is responsible for the preparation and maintenance of the plan. The triennial review of the plan involves a re-evaluation of the entire monitoring program by a work group composed of individuals knowledgeable about the ANL site environment and operations. The revised document is drafted, reviewed by ANL and DOE-ASO staff, produced, and distributed to involved ANL and DOE staff.

ANL has established objectives that describe the goals for environmental performance. Target outcomes are specific and defined monitoring steps are taken (these may also be to provide data as the result of DOE or State reporting requirements or as part of the annual contract performance measures) to determine and forecast expected outcomes. Each target outcome involves a specific task or product that is required by a specific date. Performance can then be monitored and measured to determine progress. Progress toward target outcome achievement is monitored using a data base within the EQO-EMS with required periodic monitoring inputs and status reports for lab management, federal and State review. A

quarterly meeting is also held with DOE to discuss environmental monitoring results and any environmental issues that may have come up.

Many of the status monitoring reports are combined to make up the annual *Site Environmental Report (SER)*. Preparation of an annual *Site Environmental Report* is required by DOE Order 231.1.A. Each year, detailed guidance is provided by DOE EH-41 which describes the suggested format and content for the SER and establishes the goals of the report. EQO-EMS is also responsible for the preparation of the annual SER. The monitoring data is augmented by information from subject-matter-experts on specific topics to be covered in the SER. This information is assembled, consistent with the EH-41 guidance, the report drafted, reviewed internally and by DOE-ASO staff, produced, and distributed to DOE and ANL staff along with federal, state, and local environmental regulators each year by October 1.

Examples of other periodic reports to regulatory agencies include: the monthly *Discharge Monitoring Reports* (www.anl.gov/ESH/ems/npdes), aquatic toxicity reports, and priority pollutant reports required by the NPDES Permit; the quarterly *800 Area Landfill Groundwater Monitoring Reports* (www.anl.gov/ESH/ems/800area) and the annual *800 Area Landfill Summary Report*; the annual *NESHAP Report*, *Air Emissions Report*, *TRI Report*, and the *Waste Generation Report*. Other communications include documents required by the RCRA Part B permit corrective actions section which includes quarterly progress reports and Solid Waste Management Unit (SWMU) reports. Some reports are supplied via the ANL website to the public at large. Feedback can come from any of those receiving reports.

Occurrence Reporting, Corrective Actions, Follow Up and Feedback

Occurrence reporting and corrective actions are required when a formal notification of enforcement has been received from a relevant outside regulatory agency (e.g. Notice of Violation, Notice of Deficiency, Notice of Intent to Sue, Notice of Noncompliance, Warning Letter, Finding of Violation, Finding of Alleged Violation, or a similar type enforcement action). Environmental releases exceeding specific permit or federal or state regulation amounts also require occurrence reporting, corrective actions and follow up. Responses to the regulatory agencies on notices of enforcement and environmental releases are coordinated with DOE. Depending on the occurrence, the incident may be reported as part of several reporting systems. The systems that are normally used for reporting incidents are described in the *ESH Manual* Chapters 1.7 *Incident Reporting and Analysis* and 1.8 *Occurrence Reporting*. The type of report is based on the severity of the incident. If the release involved radiological material, the system defined in *ESH Manual* Chapter 1.2 *PAAA Compliance Validation and Noncompliance Reporting Program* would also be used. The State would also be notified and corrective actions would be discussed and tracked. These systems have their own corrective action approval process, tracking of those actions and follow up to assure corrections have been completed. These systems are also available to laboratory personnel throughout the DOE complex for lessons learned and ANL takes those from the DOE and ANL systems that could have application to ANL programs and makes them available on a Lessons Learned website (See *ESH Manual* Chapter 1.12 *Feedback and Lessons Learned Program*).

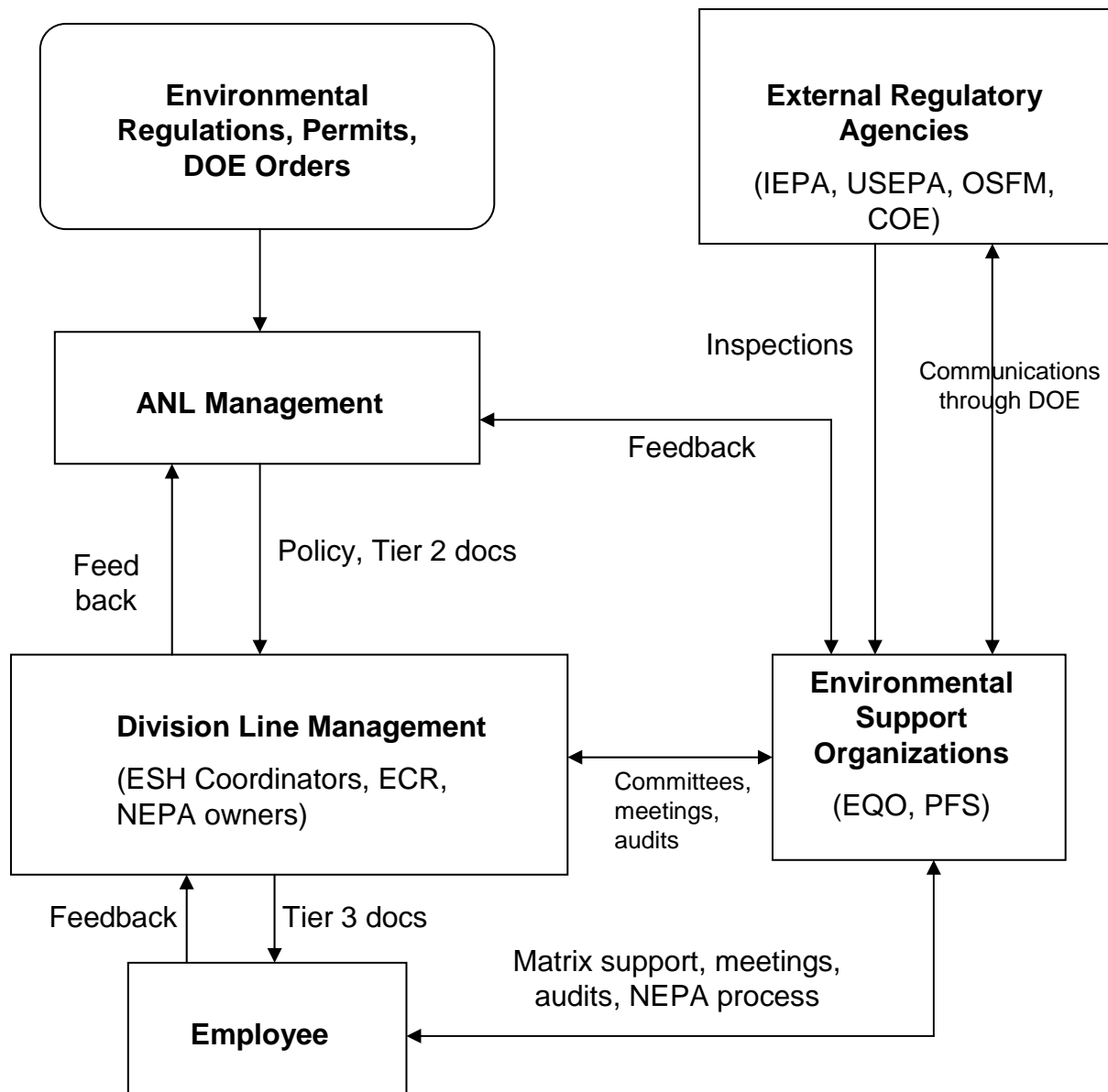
Environmental Assessments

Environmental assessments are conducted by both management self-assessments and by independent assessments. Self-assessments are required to be performed by each ANL Division and may include the accumulated results of activities such as walkthroughs, incident investigations, topical reviews, employee feedback, etc. The requirement and procedures for management self assessments are found in the *ANL Quality Assurance Program Plan (QAPP)* Part 1, Chapter 2.8 and Part 2, Chapter 3.1. Independent assessments are conducted by individuals normally outside the Division or Program being reviewed and may include assessment by organizations such as EQO, DOE, State or Federal EPA, or at the request of ANL management. Requirements and procedures for performing independent assessments can be found in the *QAPP*, Part 1, Chapter 2.8 and Part 2, Chapter 3.2. Both the management self-assessment and the independent assessment include environmental protection as a subject to be covered in the review. Deficiencies found in the environmental program at the Division level are to be corrected and tracked by the Division's corrective action system (*QAPP*, Part 1, Chapter 2.6; Part 2, Chapter 1.2). The EQO annual management assessment includes an overall assessment of the ANL ISMS performance and of EMS Compliance. Corrective actions and schedules are tracked by the EQO-Track system for deficiencies identified by DOE or EQO.

4.2 Management of Environmental Aspects in ANL Operations

ANL operations, including institutional and work level activities, may involve one or more environmental aspects. The line managers for these activities are responsible for taking into account the affected environmental aspects in their projects and programs. ANL develops and maintains environmental management programs that are pertinent to the operations of the Laboratory. The following sections discuss each environmental aspect and its corresponding management program. The programs will be summarized here, but more detail can be found in the *ESH Manual*. The individual *ESH Manual* chapters for specific environmental programs are referenced. The vertical integration for all new activities begins with the work project in which the NEPA process must be used. For ongoing activities, the existing safety evaluations, NEPA documentation, and permits define and envelope the environmental considerations including the environmental hazards involved, the hazard mitigation and the hazardous release limits. Changes to any of these on-going operations that have the potential to adversely impact the environment beyond the existing envelope or violate a regulation/permit must go through the same NEPA process as the original operation. Implementation of the environmental programs requires close integration and coordination among ANL management, line Divisions, the relevant support staff and the external regulatory agencies. Line management responsibilities are identified in the corresponding section of the *ESH Manual*. Figure 4.1 graphically illustrates the integration pathways and mechanisms for the management of the environmental aspects and is consistent with the vertical and horizontal integration contained in the *ISM Description Document*.

Figure 4.1 Environmental Program Integration



4.2.1 Air Emissions Management (See also *ESH Manual* Chapter 10.3)

Background

The ANL site contains a number of sources of conventional and hazardous air pollutants. There are landfill-generated gases at the closed and capped 800 Area Landfill and from the 317/319 Area phytoremediation plantation. The central steam plant in Building 108 generates oxides of nitrogen, sulfur dioxide, carbon monoxide, particulates, volatile organics, and hazardous air pollutants as the result of burning coal. Gasoline vapors are emitted at Building 46 as a result of fuel-dispensing activities. Building 206 and 308 contain alkali metal reaction booths while Building 368 houses a carpenter shop that operates a dust collection system. An engine test facility is housed in Buildings 370, 371, and 376. Radionuclide

emissions also occur from 12 buildings that contain laboratories and facilities using or generating radioactive materials.

Requirements

Air emissions are regulated by an Illinois Environmental Protection Agency (IEPA) permit issued under Title V of the Clean Air Act Amendments of 1990. Fleet vehicle emissions are regulated by the clean fuel fleet program. The other applicable standard is the NESHAP standard for asbestos and radionuclides. The NESHAP standard for radionuclides is specific to DOE facilities (40 CFR Part 61, Subpart H) and establishes emission limits for the release of radionuclides other than radon. Executive Order 13148 requires ANL to reduce or eliminate the use of Class I ozone-depleting substances.

Responsibilities

Line management is responsible for identifying and monitoring the air emissions at their facilities, maintaining any required records, and maintaining their operations within permit limits. They are also responsible for notifying and supplying data to the EQO-ECO and the EQO-EPC if they exceed permit limits, plan on changing operations such that a revised or new permit application needs to be submitted or for annual reporting requirements. The permit is held jointly with DOE.

The EQO-ECO is responsible for notifying the IEPA of noncompliance with regulatory and/or permit conditions. The EQO-EPC is responsible for compiling and reviewing information for new permit applications and coordinating their submittal to the IEPA. They are also responsible for maintaining the master files of ANL permit applications and approved permits, for ensuring that the annual emission reports are submitted, and managing the use of Class I ozone-depleting substances. EQO-IH is responsible for air monitoring of asbestos removal projects and preparing the annual notification to the IEPA of the total amount of asbestos removed. EQO-EMS is responsible for site-wide and off-site monitoring of radionuclides and for collecting radionuclide emission data from facility managers and calculating the estimated committed effective dose equivalent to the maximally exposed member of the public. They are also responsible for arranging for these calculations to be transmitted to the Illinois Department of Nuclear Safety, the IEPA and EPA. EQO-EMS is responsible for issuing the *ANL Site Environmental Report (SER)* in which a more detailed listing and discussion of air emissions is provided in the environmental compliance summary chapter.

PFS is responsible for all asbestos removal projects and for insuring that EQO-IH is consulted for advice and air sampling on the project.

4.2.2 Water Effluents (See also the ESH Manual Chapter 10.4)

Background

ANL receives all of its domestic water from Lake Michigan through the DuPage County Water Commission, but does have deep water wells that were formerly used and still exist in case of emergency. ANL also receives water on-site from rain storms, the Shipping and

Sanitary canal, and several small streams that run through the site. All of this water is ultimately discharged to surface water streams on-site through the following sources:

- laboratory waste water treatment plant ,
- sanitary waste water treatment plant,
- the DuPage County Treatment Plant,
- various outdoor operations e.g., water flower beds, fire hydrant testing, etc.,
- building discharges from sumps and sewers, and
- storm water runoff.

While radioactive materials are not intentionally discharged to the waste water system, some small amounts may be detected from the waste water treatment plant and are typically a function of the laboratory programs that are active and the level of contamination in groundwater extracted from the 317/319 area. Knowledge of changes to the environmental surface water aspects from laboratory operations is maintained through the NEPA and the voluntary project review process to identify any changes or additions to surface water releases.

Requirements

The Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) permit process for control of wastewater discharges. Most of the nonradiological discharges to surface water are limited by the NPDES permit issued for ANL by the IEPA. The permit identifies twenty-eight points at which ANL discharges water to local streams that require monitoring, contains numeric limits and monitoring frequencies on certain pollutants likely to be present and sets forth a number of additional specific and general requirements. In addition, ANL must comply with the State of Illinois effluent and stream water quality standards. Radiological releases to surface water are governed by DOE Order 5400.5.

Responsibilities

Line management is responsible for training their personnel in the correct methods of discharging hazardous effluents into the laboratory drains and for identifying and monitoring the discharges in their operations through the NEPA review process and the laboratory retention tank system. They are also responsible for identifying approaches to reduce or eliminate industrial pollutant discharges and for complying with the *Storm Water Pollution Prevention Plan*.

EQO-EPC is responsible for management of the NPDES permit. This includes permit renewal activities, compliance with non-analytical requirements of the permit, oversight of implementation of all requirements of the permit, and management of the *Storm Water Pollution Prevention Plan* and annual inspections. EQO-EMS is responsible for all permit-driven sampling, analysis, and reporting, including the priority pollutant, aquatic toxicity testing special conditions and radiological monitoring of the surface water.

PFS is responsible for the proper operation of the wastewater treatment plant and in coordination with EQO-EMS, for keeping its effluent discharges within permit limits.

4.2.3 Drinking Water (See also the *ESH Manual* Chapter 10.5)

Background

ANL obtains its domestic water from the Lake Michigan through the DuPage County Water Commission. The incoming water is connected to the ANL distribution system at Building 129. The environmental aspect of the drinking water is the distribution throughout the laboratory and the discharge of used domestic water to surface water. The drinking water has been chlorinated before it is received by ANL but additional chlorine may be added to maintain the levels required by state regulations. In addition, ANL has been adding zinc and polyphosphates to the water to inhibit the dissolution of the copper pipes. These additions are conducted to reduce the amount of copper that is discharged and maintain compliance with the copper limit on the NPDES permit.

Requirements

The regulations covering drinking water are in the Safe Drinking Water Act which establishes a number of conditions related to wellhead protection, monitoring, treatment, and underground injection requirements. These regulations apply to the supplier of the drinking water. Since ANL is a customer and not a supplier of drinking water, they do not apply to ANL.

Responsibilities

Line management has no responsibility for the supply of drinking water, but has responsibility for avoiding actions that could cause backflow into the drinking water system and has the same responsibility as noted above for any discharges using drinking water mixed with any hazardous materials.

PFS is responsible for adding any chemicals and for monitoring these additions so that concentrations remain within the optimum range. PFS is also responsible for the operation of the drinking water treatment and distribution system.

The EQO-EMS is responsible for the preparation and distribution of the annual *Consumer Confidence Report* which defines the drinking water quality and is available to all ANL personnel at www.anl.gov/ESH/ems/drinking_water.

4.2.4 Waste Management (See also *ESH Manual* Chapter 10.6 and the ANL *Waste Management Procedures Manual*)

Background

The operations of ANL generate several categories of wastes. Sanitary solid waste are collected from offices and buildings site wide by the PFS-Custodial Department and disposed in solid waste landfills off site by contractors. Hazardous, special, radioactive (low-level and transuranic) and mixed (hazardous and radioactive) wastes are typically generated by laboratory

research activities and support organizations/activities, i.e. Central Shops, boiler house, D&D and remediation project etc. These wastes are managed through Waste Management Operations (WMO) of PFS.

Requirements

There are a number of laws and regulations apply to the generation, storage, treatment and disposal of hazardous, radioactive and mixed wastes. The Resource Conservation and Recovery Act (RCRA) regulate hazardous wastes such as toxic metal waste and organic solvents. The Illinois Environmental Protection Agency issued a RCRA Part B permit to ANL in September 1997 for the storage and treatment of hazardous wastes generated by ANL operations. The Toxic Substances Control Act (TSCA) regulates the management of PCB waste. The removal of asbestos is regulated through the National Emissions Standards for Hazardous Air Pollutants of the Clean Air Act. DOE Order 435.1, Radioactive Waste Management, provides the requirements for the management of low-level and transuranic wastes. Mixed waste is regulated through both RCRA and DOE requirements.

Responsibilities

Division waste generators are required in the planning stage of their projects and operations to identify through the NEPA process any waste generated. Generators must ensure by consulting with appropriate support organizations or their Division ECR, that no waste will be generated that does not have path for disposal. After the waste is generated, generators must follow the rules and procedures for waste collection, packaging, storage and segregation provided by WMO or their line management.

PFS-WMO is the main support organization that is responsible for waste pick-up, sorting, consolidation, treatment, packaging, storage and certification for off site disposal. These activities are procedurized in the *WMO Waste Handling Procedures Manual* which can be accessed on the ANL web site at www.aim.anl.gov/manuals. The EQO Environmental Compliance Group provides support to line Divisions and WMO on regulatory compliance requirements with the RCRA Part B permit and other relevant regulations as well as on the preparation of NEPA documentation. EQO Training provides waste generator training and radioactive worker training for personnel identified by their JHQ. ANL emergency response training meets the requirements of 29CFR1910.120.

4.2.5 Waste Minimization/Pollution Prevention Program (See also ESH Manual Chapter 10.6)

Background

The ANL Pollution Prevention (P2) Program explores, creates, and communicates new ways to minimize and prevent pollution in all levels of research, development, and operational activities and preserves natural resources. The program's long-term strategy is identified in the ANL *WM&P2 Management Plan* (www.anl.gov/EQO/epc/p2_wed_page/index). In keeping with the commitment to continuously improve, ANL has maintained the following activities: a P2 Advisory Committee; a process to integrate P2 into the project/activity environmental review; an Affirmative Procurement (Green Purchasing) Program; and programs

to recycle and reuse waste, scrap, and excess materials such as paper, metals, office equipment, batteries, chemicals, toner cartridges and industrial materials.

In addition, a Sustainable Design Policy has been established by PFS and it has been recognized for its role in sustainable design to meet Leadership in Energy and Environmental Design (LEED) criteria. In 2003, the ANL Central Supply Facility was awarded the “Silver” rating by the U. S. Green Buildings Council for LEED. This building was the first federally owned building to achieve the “Silver” LEED rating. Another significant component apply life-cycle assessment concepts and practices so as to enhance the return-in-investment. Also, the ANL Land Management and Habitat Restoration activities support some of the P2 initiatives (see 4.2.7).

Requirements

These goals are driven by and linked to the requirements of the DOE Order 450.1, specifically the pollution prevention and sustainable environmental stewardship goals.

Responsibilities

Line management is responsible for continuously evaluating their operations to look for ways to reduce or eliminate waste and prevent pollution. For all new projects/activities, line management must integrate waste minimization/PP into the environmental review process by filling out the Waste Minimization/P2 Form (ANL Form 616) or the ERF.

EEO is responsible for development and implementation of the WM&PP program and for monitoring continuous improvement and tracking P2 goals. They also, in coordination with EEO Training, develop and maintain the P2 training course given to all employees.

The WM&PP Advisory Committee is responsible for assisting in developing, establishing, managing and promoting WM&PP policies and programs that encompass source reduction and pollution prevention, recycling and reuse, material substitution, technology development, and affirmative procurement.

4.2.6 Floodplain/Wetland Management (See also *ESH Manual* Chapter 10.4)

Background

In 1993, a site wide wetland delineation map was developed which identified all jurisdictional wetlands present on the site. An accompanying report described in detail the soil, vegetation, and hydrology of each wetland area delineated on the map. Thirty-five individual wetland areas were identified with a total area of approximately 45 acres. In 2001, an Environmental Assessment was completed that addressed wetland management work. This Environmental Assessment encompassed the wetland restoration activities as well as other related wetland management activities planned for the future. The related activities include enlargement of on-site wetlands to provide advance compensatory mitigation for modifications to existing wetlands that may result from future construction activities.

Floodplain management includes the development of maps showing the 100- and 500-year floodplains which are limited to low lying areas near Sawmill Creek, Freund Brook, Wards Creek, and other small streams and associated low-lying areas. No significant structures are located in these areas. To ensure that these areas are not adversely affected, new facility construction is not permitted in these areas, unless there is no practical alternative. Any impacts to floodplains are fully assessed in a floodplain assessment, and, as appropriate, documented in the NEPA documents prepared for a proposed project.

Requirements

Section 404 of the Clean Water Act establishes regulations for the discharge of dredged and fill material into waters of the United States, including wetlands. The Corps of Engineers (COE) administers this program. The federal wetland protection policy is contained in Executive Order 11990. The Executive Order requires federal agencies to identify potential impacts to wetlands resulting from proposed actions and to minimize these impacts. The federal policy on managing floodplains is contained in Executive Order 11988. This Executive Order requires federal facilities to avoid, to the extent possible, adverse impacts associated with the occupancy and modifications of floodplains. 10 CFR 1022 sets forth DOE policy and procedures for complying with Executive Orders 11990 and 11988.

Responsibilities

Line management is responsible to identify any wetland or floodplain issues as part of the NEPA review process.

EQO-EPC is responsible for the management of the wetlands program including obtaining funding for the program, coordinating and managing field work, obtaining inside or outside support to carry out the tasks of the program, and interfacing with ANL and DOE staff. A critical component of wetlands management is to conduct prescribed burns to remove non-native species. This is conducted by contractors that follow ANL procedures. PFS is responsible for floodplain avoidance on construction projects.

4.2.7 Land Management and Habitat Restoration

4.2.7.1 Endangered Species (See also *ESH Manual* Chapter 10.13)

Background

No federally listed threatened or endangered species are known to occur on the ANL site, and no critical habitat for listed species exists on the site. Three federally listed endangered species are known to inhabit the forest preserve that surrounds the ANL property.

Requirements

The Endangered Species Act of 1973 (ESA) is the federal legislation designed to protect plant and animal resources from the adverse effects of development. The implementation of the Act resulted in the establishment of lists of threatened and endangered species, or critical habitat of such species. ANL must assess the area of all proposed projects to determine whether it contains any threatened or endangered species.

Responsibilities

Line management must identify and provide a statement describing the potential impact to threatened or endangered species and critical habitat as part of the NEPA project review process. The ALD NEPA Owners are responsible for the identification of threatened and endangered species in coordination with the EQO-EPC.

EQO-EPC is responsible for managing the threatened and endangered species program and assisting line management in the identification of threatened and endangered species.

4.2.7.2 Habitat Restoration (See also *ESH Manual* Chapter 10.1)

Background

A formal committee for land management and habitat restoration was established in the 2003 with the goal to improve the site. As a result, several land management and habitat restoration projects have been proposed and completed. Completed examples include a prairie installation in a former parking lot in the East Area; and several areas that were recently cleared and burned in order to reduce invasive species and encourage native species, including areas by the main gate, the area between Outer Circle and Lodging, an area south east of the 300 area, and an area west of Kearney Road.

In January 2005, the Land Management and Habitat Restoration Committee was reconstituted upon its transfer to EQO. A revised charter focused on continuing the development, establishment, management, and promotion of sustainable land management and effective habitat restoration programs. Accomplishments in 2005 include: new mowing maps for weed control; three prescribed burns in wetlands; herbiciding for buckthorn; and the establishment of a native habitat tour route.

DOE and ANL belong to Chicago Wilderness, a partnership of more than 100 public and private organizations that have joined forces to protect, restore, and manage natural areas in the Chicago region and support their Biodiversity Recovery Plan. DOE and ANL have also partnered with the USEPA to use native landscaping to help the Chicago region meet air quality standards for ozone.

Regulations

DOE Order 450.1 is the main driver for habitat restoration but there are also federal statutes that cover responsible land management and facility siting. In conformance with the Order, ANL recently developed a *Land Management and Habitat Restoration Implementation Plan*, and includes requirements for the use of natives plants (EO 13148).

Responsibilities

Several organizations are responsible for and involved in habitat restoration activities including PFS, EQO-EPC and Ecological & Geographical Sciences Group. DOE-ASO provides

input and oversight to the work. Specific Committee responsibilities were assigned when the Land Management and Habitat Restoration Committee was reconstituted in January 2005.

4.2.7.3 Wildland Fire Management (See also *ESH Manual* Chapter 8.1 & 11.2)

Background

Fire hazard analyses for ANL facilities indicate a low risk for a wildland fire originating either on site or in the surrounding Forest Preserve to affect site buildings or people. This is due to the type of mature hardwood forests present on site, the extensive roads, sidewalks, and mowed areas that act as firebreaks, and the mowed grassland areas around buildings. Due to major wildland fires on or near DOE facilities at Los Alamos, Hanford, and Idaho Falls that resulted in significant damage to property and infrastructure, DOE issued a Wildland Fire Management Policy.

Requirements

The DOE *Wildland Fire Management Policy* issued on February 24, 2003, requires contractors to implement a program, as appropriate to protect site resources from wildland fires as part of their Integrated Safety Management System. This policy has been incorporated as a requirement under DOE Order 450.1. DOE also requires ANL to have an emergency management program (DOE O 151.1) and a fire protection program (DOE O 420.1A) that include plans, equipment and trained personnel for fire emergencies.

Responsibilities

Line management must ensure that employees are trained to immediately report via an emergency 911 call any fires including any outdoor fires they observe. Further actions such as facility evacuation would be at the judgment of the facility area emergency supervisor. This decision would be made, if time allows, in coordination with the fire department's incident commander, with input from the team assembled at the Emergency Response Center.

Three groups are responsible for updating fire hazard assessments and planning responses to potential wildland fires: the EQO-Environmental Compliance Group, the SCD Emergency Management organization and the SCD Fire Department. The Environmental Compliance Group is involved with wildland fire management through the wetland management program which requires periodic burns to remove unwanted vegetation. The EQO-EPC staff have managed a number of wetland and habitat restoration burns. The Emergency Management organization is responsible for the ANL Comprehensive Emergency Management Plan and Emergency Implementing Procedures; portions of which evolve from fire safety analyses, fire protection planning and fire related exercises. The Fire Department is responsible for fighting all fires and for a) providing their staff with training in wildland fire control, b) instituting a wildland fire procedure (Emergency Response Procedure 25) and c) participating in the control and/or extinction of wildland fires occurring in the ANL community as part of ANL's participation in mutual-aid agreements with other fire departments. The Fire Department is also responsible for coordination with the Emergency Management organization in the emergency planning and procedures for fire related incidents and related drills, and with the Environmental Compliance Group in the planning for wetland burns.

4.2.8 Wildlife Management (See also *ESH Manual* Chapter 10.13)

Background

All wildlife management activities are conducted by the U.S. Department of Agriculture (USDA) under an interagency agreement with DOE.

Requirements

DOE adopted USDA's *Environmental Assessment for Management of Wildlife Causing Damage at ANL*. This assessment coupled with federal, state and local laws and regulations govern the wildlife management program. The Illinois Department of Agriculture issues to DOE annual permits for nuisance wildlife control and 90-day permits for removal of white-tailed deer.

Responsibilities

Line management is responsible to notify PFS of any wildlife problems and to adhere to the ANL requirement that prohibits the feeding of wildlife.

PFS is responsible for coordinating with DOE to obtain the services of the USDA for removal of nuisance wildlife.

4.2.9 Pesticide Management (See also *ESH Manual* Chapter 10.10)

Background

In order to maintain a healthful and safe environment in and around the site, it is sometimes necessary to control certain types of insects and rodents. The typical approach is to conduct spraying of a pesticide for insect control, applying a fungicide for mold control, and distributing toxic bait for rodent control. Weed control is achieved by spreading a herbicide, usually in combination with some other material like a fertilizer. On a limited basis, weed control is accomplished by digging or pulling the weeds. Gypsy moth control is occasionally conducted at ANL by the Illinois Department of Agriculture under the U.S. Department of Agriculture Forest Service Slow-the-Spread program.

Requirements

The particular regulation that addresses the control and use of pesticides and herbicides is the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The FIFRA regulations mandate a program for federal agencies to regulate the transportation, application, and disposal of pesticides and herbicides.

Responsibilities

Line management are not to use pesticides for any problem they may have, but are to notify PFS for that service or to obtain PFS approval before a service is procured.

Except for commercially available lawn fertilizer/weed killer products used in small amounts by PFS, PFS is responsible for procuring licensed contractors who provide and apply the chemicals used and remove any unused portions. Designated PFS staff are responsible to coordinate the contractor's activities and ensure that the chemicals are USEPA-approved. Illinois Department of Public Health-licensed contractors provide indoor pesticide applications. The indoor applications involve only USEPA "Restricted Use" products. On-site contractors that provide food and lodging services are responsible for ensuring that all pesticide applications in their contracted properties are conducted in compliance with FIFRA.

4.2.10 Cultural Resources Management (See also *ESH Manual* Chapter 10.1)

Background

Cultural resources include archaeological sites and historic structures and features that are protected under the National Historic Preservation Act (NHPA). The majority of the ANL site has been surveyed for archaeological resources. The surveys identified 46 archaeological sites consisting of both prehistoric sites and historic era farmsteads. Four of the sites are eligible for listing on the *National Register of Historic Places* (NRHP), 21 are not eligible for listing, and 21 have not been evaluated for eligibility. This survey has limited distribution by regulation, but additional information may be obtained by contacting EQO-EPC.

A site wide historic building inventory was completed in 2001. There are two historic districts at ANL (the Main Campus Historic District and the Freund Estate District) and several buildings that are individually eligible for listing on the NRHP. Eligible buildings are identified via a help intranet link to question 15 of the Environmental Review Form.

Requirements

Cultural resources at ANL are regulated primarily by the NHPA, and also potentially by other statutes including the Native American Graves Protection and Repatriation Act and the Archaeological Resources Protection Act. DOE has entered into a Programmatic Agreement with the Illinois Historic Preservation Agency and the Advisory Council on Historic Preservation concerning management of historic and cultural properties at ANL. This agreement clarifies and streamlines the application of the review process in Section 106 of the NHPA by allowing standard mitigation measures and by excluding from review certain categories of activities that are unlikely to adversely affect historic structures.

Responsibilities

Line management and PFS project managers are responsible for identifying through the NEPA review process, as well as through the ANL digging permit process, if planned

activities would affect either (1) archaeological sites that are eligible for listing on the NRHP or that have not been evaluated for eligibility, or (2) buildings that are eligible for listing.

The ANL-NEPA Reviewer with support from PFS in site planning is responsible for maintaining the ANL Cultural Resource Program and for helping line management and PFS project managers identify whether or not planned actions would affect cultural resources.

4.2.11 Chemical/Petroleum Product Management

4.2.11.1 Polychlorinated Biphenyl (PCB) Management (See also *ESH Manual* Chapter 10.9)

Background

PCB materials have been used in the past in dielectric fluids of electrical distribution equipment. Although most of the PCB materials in this type equipment have been replaced with non-toxic substitutes, small quantities of PCBs remain in critical equipment. The PCBs in use at ANL are contained in capacitors and power supplies that are critical to operations and no alternative components are available. PCB items in use or in storage are tracked by the ANL PCB Item Inventory Program. All PCB items identified by the PCB program have been labeled and are described in the inventory with regard to location, quantity of PCBs, manufacturer, and the uniquely assigned identification number.

Requirements

The proper labeling, inspection, storage, and disposal of PCBs and PCB-containing items are carried out in compliance with the Toxic Substances Control Act (TSCA) and its associated regulations. These regulations provide specific authorizations and prohibitions on the manufacturing, processing, and distribution in commerce of designated chemicals. The principal impact of these regulations at the ANL site affects the handling of PCBs and suspect PCB-containing items. TSCA requires that a facility notify the EPA or the National Response Center of releases of PCB in concentrations of 50 ppm or more. Such spills must be cleaned up in accordance with the USEPA PCB criteria in 40 CFR 761, Subpart G.

Responsibilities

Line management is responsible to:

- ensure that employees are trained to call 911 and report any known or suspected spills;
- ensure that spills are properly cleaned up and that the necessary information is provided to EQO for the appropriate notifications to DOE and outside agencies;
- complete the DOE ORPS;
- ensure that any PCB item or equipment that they own is labeled, inspected, repaired, and properly disposed of;
- ensure that inventory reports are updated and maintained.

Support organizations share a number of responsibilities. EQO-EPC must prepare the annual PCB report, maintain an inventory of all PCB equipment, and inform the Fire Department annually of the location of PCB equipment. EQO-EPC must also participate in the assessment of spill events, determine reporting requirements, and notify off-site agencies, if appropriate, coordinate the clean up analysis of PCBs, and interface with regulatory agencies on compliance inquiries. PFS Building Maintenance must label, inspect, update inventory reports, and repair PCB equipment not owned by a programmatic division. PFS-WMO is responsible for the management and disposal of PCB wastes including waste materials generated by the clean up of a PCB spill.

4.2.11.2 Management of Toxic Substances Control Act (TSCA) Chemicals (See also *ESH Manual Chapter 4*)

Background

ANL uses, imports and exports chemicals in its normal course of business. Shipments into and out of the Laboratory are controlled through PFS. All chemicals are shipped and received in accordance with the ANL *Hazardous Materials Transportation Safety Manual* (www.aim.anl.gov/manuals/tsm).

Requirements

The Toxic Substances Control Act (TSCA) regulations govern the shipping and importing of TSCA chemicals. The development, testing, manufacturing and distribution of TSCA chemicals in commerce are also subject to TSCA regulations.

Responsibilities

Line management is responsible for assuring that all projects/experiments are reviewed for relevant TSCA requirements during the NEPA review process before commencing activities. Line management must also coordinate with PFS any chemicals that are being imported or exported from the Laboratory for TSCA record keeping requirements.

EQO-EPC and ANL-Legal are responsible for the preparation of TSCA required paperwork and record retention. EQO-EPC also provides advice and assistance to line management about relevant TSCA requirements.

PFS is responsible for the shipping and receiving of chemicals in accordance with TSCA requirements.

4.2.11.3 Underground Storage Tank Management (See also *ESH Manual Chapter 10.11*)

Background

ANL is currently responsible for maintaining 18 Underground Storage Tanks (USTs). Eight of which are used to store fuel oil for emergency generators. The balance of the USTs are

for on-site vehicle fueling and maintenance (Building 46 and the on-site vehicle service station use underground tanks to store diesel fuel, gasoline, used oil, antifreeze, and ethanol/gasoline blend).

Requirements

The RCRA program includes regulations governing management of USTs containing hazardous materials or petroleum products. The Office of the State Fire Marshal (OSFM) and the IEPA have been authorized to administer most aspects of the RCRA UST program in Illinois. The OSFM is responsible for regulating the daily operation and maintenance of USTs and to register tanks, license tank installation and removal contractors, monitor compliance with leak prevention and leak detection requirements, and permit tank system installations, closures, and removals. The IEPA is responsible for regulating USTs after a release has occurred and the tank is classified as a leaking UST. The IEPA is also authorized to respond to releases or threatened releases of petroleum or hazardous substances from USTs; provide environmental assessments; manage laboratory analyses; and supervise leaking tank site cleanups.

Responsibilities

PFS is responsible for all underground tanks, including performing required tests and maintenance and the generation, submission, and retention of all required records and reports. PFS submits copies of these reports to DOE-ASO for submission to the appropriate regulating agency. The EQO-EPC is the ANL interface with the inspectors from the Office of the State Fire Marshal, provides technical and regulatory support to PFS, maintains a current inventory of all active and inactive USTs, and provides independent oversight of operations to ensure that they are conducted in conformance with the regulations.

4.2.11.4 EPCRA Reporting (See also ESH Manual Chapter 10.8)

Background

The Emergency Planning and Community Right-To-Know Act (EPCRA) mandates that states establish state emergency response commissions and local emergency planning committees and develop a process to distribute information on hazardous chemicals present in facilities. These state organizations gather information and develop emergency plans for local planning districts. Facilities such as ANL, that produce, use, or store extremely hazardous substances in quantities above threshold planning quantities must identify themselves to the state emergency response commission and the local emergency planning committees, and periodically provide information to support the emergency planning process. Facilities must also notify these entities immediately after an accidental release of extremely hazardous substances over the reportable quantity. ANL uses the Chemical Management System to track the use of more than 600 chemicals that are on the EPCRA list of reportable chemicals and to determine if the total quantity of any chemical exceeds the threshold quantity.

Requirements

Title III of the 1986 Superfund Amendments and Reauthorization Act amendments to CERCLA is EPCRA, a free-standing provision. ANL is required to submit reports pursuant to Sections 302 (*Planning Notification*), Section 304 (*Extremely Hazardous Substances Release Notification*), Section 311 (*Material Safety Data Sheets*), Section 312 (*Chemical Inventory*), and Section 313 (*Toxic Release Inventory Report*). Although ANL is not within the range of Standard Industrial Codes specified in the statute, ANL reports this information because of the requirement in Executive Orders # 12856 and 13148 and DOE Order 450.1.

Responsibilities

Line managers must ensure that employees within their organizations are trained to report any known or suspected spills or releases in accordance with DOE Orders and the ANL *Spill Prevention, Control, and Countermeasures Plan* reporting procedures as required under the CWA (www.aim.anl.gov/manuals/spill). Each ANL Division (via ECR) must annually provide to the emergency management officer information about the quantities of hazardous chemicals stored in the Division's areas. This information is needed to prepare the EPCRA Tier Two (Section 312) reports. Also, line management must ensure that adequate recordkeeping on usage of chemicals on the Toxic Release Inventory list is maintained to provide annual information to the EQO Environmental Compliance group for the determination of the need to file a Form R report under EPCRA Section 313.

The SCD Emergency Management Organization prepares the preparation of the annual EPCRA Section 312 reports of the hazardous chemical inventory. Also, the Emergency Management Organization updates submittals of Section 311 MSDSs whenever revisions are necessary. The EQO Environmental Compliance group evaluates the need for reporting under EPCRA Section 313, and is responsible for reporting under this provision, if necessary. The EQO-ECO will assist with the assessment of spill events, determination of reporting requirements, and development of plans for remediation. Cleanup of spills is coordinated with PFS Waste Management.

4.2.12 Long-Term Stewardship (See also *ESH Manual* Chapters 1.1 & 10.6)

Background

Long-term stewardship is the range of activities necessary to ensure the proper protection of human health; and natural and cultural resources at the ANL site. DOE as the Federal land manager must ensure that the appropriate institutional controls are in place to manage the lands, facilities and materials under its jurisdiction. Institutional controls may also be required under certain regulations such as RCRA or the Atomic Energy Act. Long-term stewardship activities designed to implement institutional controls may include the following: remediation actions designed to contain or to prevent exposure to residual contamination and waste, surveillance and monitoring activities, inspections and recordkeeping, groundwater monitoring, ongoing pump and treat activities, landfill cap repair, maintenance of other barriers and containment structures, access control and signage and deed restrictions.

Requirements

DOE P 454.1, *Use of Institutional Controls*, provides the DOE policy concerning the approach that is to be used to ensure that the appropriate level of long term stewardship is applied to DOE sites and delineates the programmatic responsibilities. RCRA as administered by the IEPA provides specific requirements for various Solid Waste Management Units (SWMUs) to address historical contamination and any requirements for long term maintenance and monitoring. These specific RCRA requirements are contained in the permit and decisions concerning the appropriate actions to be taken are memorialized in various approved work plans. The Atomic Energy Act of 1954 provides DOE with the authority to determine the appropriate levels of environmental radioactivity resulting from DOE actions. DOE O 5400.5 provides direction as to the appropriate protection of the environment. The goal is to reduce the residual radiation in contaminated areas to background levels. The monitoring and maintenance period of areas with residual radiation levels remaining, after all remediation activities have been completed, is the beginning of the long-term stewardship phase.

Responsibilities

Line management is responsible for ensuring that all ANL policies, practices and procedures concerned with preventing releases to and contamination of the environment are followed in their work activities.

EQO-EMS is responsible for performing sampling of the radiological cleanup activities, and it is responsible for all long-term stewardship established systems now that the remediation work has been completed. EQO-EPC is responsible for keeping in compliance the RCRA Part B permit conditions on remedial activities, preparing and transmitting permit modification applications, and coordinating responses to the IEPA. EQO is responsible for summarizing the long-term stewardship program activities in the annual *ANL-E Site Environmental Report*.

4.2.13 Ground Water Protection

Background

A ground water protection program is a systematic approach to ensure that all components of the program are addressed. These components include: identification and evaluation of all possible sources of ground water contamination; compliance with all applicable Federal, State, and DOE requirements; prevention or minimization of sources of contamination; prevention and control of existing sources of contamination from reaching the ground water; documentation of historic ground water activities; conducting ground water environmental monitoring and surveillance; and collecting and maintaining all ground water analytical data in a database. In totality, these components constitute a framework for managing efforts to protect ground water in a cost-effective manner and integrating compliance with applicable regulatory requirements, active remediation of contamination ground water, prevention of future ground water contamination, and ground water monitoring. Implementation of this program will

facilitate planning, implementation, and management review of site-wide ground water protection activities.

Requirements

A ground water protection program is required by DOE Order 450.1 and the supporting guidance provided in DOE G 450.1-9 “Ground Water Protection Programs Implementation Guide for Use with DOE O 450.1, *Environmental Protection Program*”. Ground water protection programs must be conducted in compliance with applicable regulations and the need to be consistent with long-term responsibilities for protection of property, the general public, workers, and the environment. Ground water remediation is required at DOE sites under the authority of the Atomic Energy Act of 1954 and the Resource Conservation and Recovery Act (RCRA). The RCRA hazardous waste permit contains provisions that require ground water monitoring for hazardous constituents and associated with remediation activities. DOE Order 435.1 “*Radioactive Waste Management*,” is required for any site that manages disposal units for radioactive waste. DOE Order 5400.5, “*Radiation Protection of the Public and the Environment*,” contains derived concentration guides for radionuclides in water and provisions for the control and release of property containing residual radioactive material. Implementation of the requirements of DOE Order 450.1, RCRA, DOE Order 5400.5, and DOE Order 435.1 should be considered a major objective of a ground water protection program.

Responsibilities

All ground water protection activities have been integrated into the EQO Environmental Monitoring and Surveillance Program. The monitoring program manager is responsible for: conducting of the site-wide monitoring program, including all ground water sampling and analyses; the long-term stewardship program; maintenance of the Argonne Ground Water Protection Management Program Plan; monitoring well inventory and status; the ground water analytical results data base; and preparing the annual Illinois Water Survey report. The results of the various ground water programs are reported to the appropriate regulatory agency as required and all results are summarized annually in the Argonne Site Environmental Report.

4.2.14 Protection of Biota

Background

The prevailing logic has long been that if dose standards are established to protect man, they will also provide adequate protection for other living things. This assumption is most appropriate in cases where humans and biota inhabit the same environment and have the same exposure routes. In many cases, biota can be exposed to radiation in pathways unavailable to humans and, in some cases, be more sensitive to radiation effects. Assessments of radiation impacts on contaminated ecosystems are currently required under CERCLA regulations. Recent experience has indicated that selected biota required dose limits that are more restrictive than for humans.

Requirements

A dose limit for controlling radiological impacts from facility activities to native aquatic animals is specified in DOE Order 5400.5. There are no DOE dose limits for terrestrial organisms. DOE had proposed dose limits for aquatic and terrestrial biota under the proposed rule 10 CFR 834, but withdrew the biota section because there was no guidance for demonstrating compliance. Studies by the NCRP and IAEA recommended dose limits but these have not been incorporated into any regulations. To provide an approach to estimating dose to biota, in July 2002, DOE issued DOE-STD-1153-2002, “*A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota*,” to assist sites in evaluating dose to biota.

Responsibilities

The EQO Environmental Monitoring and Surveillance Program is responsible for the assessment of potential dose to the public and the environment including biota. To provide analytical data to conduct the biota dose assessment, sampling is scheduled and analyses performed on environmental media that provide radionuclide specific concentrations in water, soil, and sediment. Using the methodology in DOE-STD-1153-2002 for a screening level approach, measured maximum concentrations are compared to media/nuclide specific biota concentration guides. If the sum of the fractions is less than one, the site has demonstrated compliance with the limit in DOE Order 5400.5. The results are included in the annual Argonne Site Environmental Report.

4.2.15 State Implementation Plans

Background

The Clean Air Act (CAA) is a federal statute that sets emission limits for air pollutants and determines emission limits and operating criteria for certain hazardous air pollutants (HAPs). The program for compliance with the requirements is implemented by individual states through a State Implementation Plan (SIP) that describes how states will ensure compliance with the air quality standards for stationary sources. For those facilities to which it applies, a Title V permit is issued that covers all regulated emissions and specific conditions that ensure that the facility will be in compliance with all the conditions of the SIP.

Requirements

Under Title V of the Clean Air Act Amendments of 1990, ANL-E submitted a Clean Air Act Permit Program (CAAPP) application to the IEPA for a site-wide, federally enforceable operating permit to cover emissions of all regulated air pollutants at the facility. The finalized CAAPP Title V Permit was issued on April 3, 2001. The permit supersedes the prior individual state air pollution control permits, except for open burning permits. Facilities subject to Title V must characterize emissions of all regulated air pollutants, not only those that qualify them as major sources. An annual compliance certification must be submitted to the IEPA and the EPA by May 1 for the previous calendar year.

Responsibilities

The EQO Environmental Compliance Group is responsible for the management and compliance with the requirements of the CAA, including the State Implementation Plan, as conditions of the Title V Permit. These responsibilities include maintenance of the Permit,

obtaining any modifications to the Permit, conducting CAA compliance oversight, and preparing the annual compliance certification report.

4.2.16 Watershed Management

Background

A watershed is defined as a geographic area of land and water within the confines of a drainage divide and the total area above a given point of a water body that contributes flow to that point. Aspects that impact surface water include, waste generation and discharge to the watershed, spills from raw material storage, construction and maintenance, energy consumption, solid waste generation and disposal, and radionuclides. Potential impacts include reduction of fresh water supplies, soil erosion, reduction of flora and fauna, and degradation of water quality.

Requirements

Watershed management is a component of the storm water regulations within the 1990 amendments to the Clean Water Act. Implementation of this requirement was effected through the insertion of special conditions in the ANL NPDES permit. An extensive storm water characterization and permitting program was initiated in 1991 and included the identification of the watershed areas that drained to each NPDES permitted outfall. All this information was captured in an ANL Storm Water Pollution Prevention Plan (SWPPP).

Responsibilities

Line management is responsible to ensure that unpermitted industrial materials are not released to the local watersheds. EQO-EPC is responsible for the management of the storm water management program including the updating of the SWPPP, conducting the annual SWPPP inspections, and preparing the inspection reports. In addition, EQO-EPC is responsible for the education of ANL staff on watershed management and prevention of the pollution of the watersheds.

4.3 Establishment of EMS Objectives and Targets

The implementation of the EMS is through the establishment and execution of objectives and targets to address the significant aspects identified in Section 4.2. It is through the achievement of the objectives and targets that an organization addresses its significant aspects, including its compliance, mission, and reduction in its environmental risk. To be confident that the objectives and targets will be effective in addressing the significant environmental aspects, it is important that they be systematically established and periodically reviewed and reconsidered within the management review process as described in Section 4.1.5 – Environmental Assessments.

The objectives describe ANLs goals for environmental performance. The objectives are a set of measurable or qualitative statements on how ANL will address each environmental aspect. There may be some environmental goals that are established outside the EMS such as contract performance measures and energy efficiency goals. Targets are specific and measurable interim steps that the organization takes to obtain the objective. Typically objectives are broken

down into more specific subordinate targets. Targets can also serve as the basis for the annual performance measures that are part of the prime contract.

The process for the establishment of the objectives and targets will be part of the annual management review of the EMS document. Each year, typically in the July time frame, the EMS will be reviewed and the objectives will be evaluated for relevance while the targets will be revised to reflect the next set of targets for continuous improvement of that area. Each environmental aspect has a subject matter expert assigned the responsibility to manage that area and will be responsible for the creation and annual updates of the objectives and targets. The environmental aspects selected from Section 4.2 along with the FY2006 objectives and targets are collected in the following table.

FY2006 Environmental Objectives and Targets

Aspects	Objectives (Goals)	Targets
Air Emissions (4.2.1)	Maintain compliance with all Title V permit condition	ECRs in conjunction with the ALD-ESH/QA representatives will conduct an assessment to determine the compliance status of all conditions of the Title V permit and submit the information to EQO-EPC by May 1, 2006. ECRs to assess the level of annual emissions and submit the information to EQO-EPC by May 1, 2006 for inclusion in the Annual Emission Report.
Water Effluents (4.2.2)	Reduce the number of NPDES permit exceedances	PFS will perform a review of methods and materials to reduce road salt usage around the

	Implement all new requirements specified by the revised SPCC rule.	<p>facility during the winter and submit a report to EQO by June 30, 2006.</p> <p>ECRs to report on the status of secondary containment requirements by November 15, 2005.</p> <p>PFS to report on implementation of revised SPCC requirements by August 18, 2006.</p>
Waste Management (4.2.4)	Achieve the waste disposal/dispositioning levels identified within the Old Waste Disposition Plan (OWDP) considering available funding.	By Sept. 30, 2006, achieve the milestones identified in the OWDP for FY2006.
Waste Minimization/Pollution Prevention (4.2.5)	<p>Maintain a Pollution Prevention (P2) Program that will integrate P2 activities into all ANL functions and will annually review and improve P2 initiatives.</p> <p>Reduce waste generation.</p>	<p>Conduct quarterly P2 Advisory Committee meetings involving representatives from across ANL, in order to provide current P2 information to ANL personnel, monitor existing P2 activities, and seek new P2 opportunities.</p> <p>Request divisional ESH coordinators to prepare an annual waste reduction plan by December 31, 2005.</p>
Floodplain/Wetlands (4.2.6)	Complete the wetlands restoration to meet the compliance drivers.	By Sept. 30, 2006, report monitoring data of wetlands to determine restoration progress.
Endangered Species (4.2.7.1)	Develop a site-wide threatened and endangered species study.	Compile an undated list of state and federal threatened and endangered species by March 31, 2006.
Habitat Restoration (4.2.7.2)	Increase the amount of native landscaping at ANL and reduce the non-native species by revising the landscaping maintenance practices.	By Sept. 30, 2006, subject to the availability of Site Enhancement funds, add native plants to 25% of the landscaping areas around the site and perform mowing of invasive species (twice) during the growing season.
Wildland Fire Management (4.2.7.3)	Maintain compliance with DOE requirements.	Conduct the annual prescribed burns of 30 acres of currently managed areas and alert DOE and ANL employees before each burn.
Wildlife Management (4.2.8)	Maintain the deer target density of 15 deer per square mile for each species (fallow and white tail).	By March 31, 2006, survey the number of each deer species on the ANL site and reduce the number to the target density of 15 deer per square mile.

Cultural Resources Management (4.2.10)	Improve the management of cultural resources.	Assuming approval of the CRMP by the State of Illinois by December 31, 2005, prepare the supporting procedures by June 30, 2006.
Polychlorinated Biphenyl (PCB) Management (4.2.11.1)	Comply with applicable regulations.	Continue to manage the site-wide PCB program including assistance in identifying and disposing of PCB items and prepare the annual PCB report by July 1, 2006.
Management of Toxic Substances Control Act (TSCA) Chemicals (4.2.11.2)	Improve the management of TSCA-regulated materials.	Produce training course (CBT) for TSCA web-page use by March 31, 2006 and include this course in the ECR-required training by June 30, 2006.
Underground Storage Tank Management (4.2.11.3)	Ensure that ANL is in compliance with the applicable provisions of the UST regulations.	Conduct an internal assessment of the ANL UST program and provide a report by September 30, 2006.
EPCRA Reporting (4.2.11.4)	Maintain compliance with the EPCRA provisions in Sections 311, 312, and 313.	<p>By March 1, 2006, prepare and submit the annual EPCRA Section 312 report of the ANL hazardous chemical inventory.</p> <p>ECRs to submit usage information on TRI chemicals to EQO-EPC for preparation of Section 313 report by July 1, 2006.</p>

Management of Toxic Substances Control Act (TSCA) Chemicals (4.2.11.2)	Improve the management of TSCA-regulated materials.	Track and record all TSCA-regulated material imports/exports, and submit a report by Sept. 30, 2005.
Underground Storage Tank Management (4.2.11.3)	Ensure that ANL-E is in compliance with the applicable provisions of the UST regulations.	Conduct an internal assessment of the ANL-E UST program and provide a report by Dec. 31, 2004.
EPCRA Reporting (4.2.11.4)	Maintain compliance with the EPCRA provisions in Sections 311 and 312.	By March 1, 2005, prepare and submit the annual EPCRA Section 312 report of the ANL-E hazardous chemical inventory.
Long-Term Stewardship (4.2.12)	Create an oak tree nursery to provide for replacement trees for the phyto plantation and for use around the ANL-E site.	By November 30, 2004, plant 150 oak tree saplings that are native to the area in the south portion of the 319 Area.

ATTACHMENT 3

Attachment 3 to DOE Guide 450.1-1/ANL EMS Crosswalk

Section	Attachment 3 Element	ANL EMS
Introduction	The environmental management system is a continuing cycle of planning, implementation, evaluating, and improving processes and actions undertaken to achieve environmental goals (DOE O 450.1@1.)	Section 1.0
	The environmental management system is part of the Integrated Safety Management System established pursuant to DOE P 450.4 <i>Safety Management System Policy</i> (DOE O 450.1@1.)	Section 1.1
Planning	The ISMS/EMS provides for the systematic planning of programs for public health and environmental protection [DOE O 450.1@4.a.(1)(a)]	Sections 4.1.1, 4.1.2, and 4.1.3
	The ISMS/EMS provides for the systematic planning of programs for pollution prevention [DOE O 450.1@4.a.(1)(b)]	Sections 4.1.1, 4.1.2, and 4.1.3
Environmental aspects	The ISMS/EMS includes policies [and] procedures to identify activities with significant environmental impacts [DOE O 450.1@4.a.(2)]	Section 4.2
Legal and other requirements	The ISMS/EMS provides for the systematic planning of programs for compliance with applicable requirements [DOE O 450.1@4.a.(1)]	Section 2.3
	The ISMS/EMS includes (if applicable) conformity of DOE proposed actions with State Implementation Plans to attain and maintain national ambient air quality standards [DOE O 450.1@4.b.(1)(a)]	Section 4.2.15
	The ISMS/EMS includes (if applicable) implementation of a watershed approach for surface water protection [DOE O 450.1@4.b.(1)(b)]	Section 4.2.16
	The ISMS/EMS includes (if applicable) protection of other natural resources, including biota [DOE O 450.1@4.b.(1)(d)]	Section 4.2.14
	The ISMS/EMS includes (if applicable) protection of cultural resources [DOE O 450.1@4.b.(1)(f)]	Section 4.2.10
	The ISMS/EMS includes (if applicable) implementation of a site-wide approach for groundwater protection [DOE O 450.1@4.b.(1)(c)]	Section 4.2.13
	The ISMS/EMS includes (if applicable) protection of site resources from wildland and operational fires [DOE O 450.1@4.b.(1)(e)]	Section 4.2.7.3
	The ISMS/EMS provides for reduction or elimination of: the generation of waste, the release of pollutants	Section 4.2.5

	to the environment, and the use of Class I ozone-depleting substances (ODS), through source reduction, re-use, segregation, and recycling and be procuring recycle-content materials and environmentally preferable products and services [DOE O 450.1@4.b.(3)]	
	The ISMS/EMS promotes the long-term stewardship of a site's natural and cultural resources throughout its operational, closure, and post-closure life cycle [DOE O 450.1@4.b.(2)]	Section 4.2.12
Objectives and targets	The ISMS/EMS includes measurable environmental goals, objectives, and targets [DOE O 450.1@4.a.(3)]	Section 4.3
	The ISMS/EMS includes site-specific goals that contribute to the accomplishment of DOE pollution prevention and energy efficiency goals [DOE O 450.1@5.c.(3)]	Section 4.3
	Contractor ES&H performance objectives, performance measures, and commitments include appropriate environmental elements based on the environmental risks, impacts of activities at the site and established Department pollution prevention/energy efficiency goals [DOE O 450.1@5.d.(17)]	Section 4.3
Environmental management program(s)	The ISMS/EMS includes policies [and] procedures to manage, control, and mitigate the potential impacts of site activities with significant environmental impacts [DOE O 450.1@4.a.(2)]	Section 4.2
	The ISMS/EMS includes (if applicable) conformity of DOE proposed actions with State Implementation Plans to attain and maintain national ambient air quality standards [DOE O 450.1@4.b.(1)(a)]	Section 4.2.1
	The ISMS/EMS includes (if applicable) implementation of a watershed approach for surface water protection [DOE O 450.1@4.b.(1)(b)]	Section 4.2.16
	The ISMS/EMS includes (if applicable) implementation of a site-wide approach for ground water protection [DOE O 450.1@4.b.(1)(c)]	Section 4.2.13
	The ISMS/EMS includes (if applicable) protection of other natural resources, including biota [DOE O 450.1@4.b.(1)(d)]	Section 4.2.14
	The ISMS/EMS includes development and implementation of cost-effective pollution prevention programs that use life-cycle assessment concepts and practices in determining program return-on-investment [DOE O 450.1@5.c.(4)]	Section 4.2.5

	The ISMS/EMS includes (if applicable) protection of cultural resources [DOE O 450.1@4.b.(1)(f)]	Section 4.2.10
	The ISMS/EMS includes (if applicable) protection of site resources from wildland and operational fires [DOE O 450.1@4.b.(1)(e)]	Section 4.2.7.3
	The ISMS/EMS provides for reduction or elimination of: the generation of waste, the release of pollutants to the environment, and the use of Class I ozone-depleting substances (ODS), through source reduction, re-use, segregation, and recycling and by procuring recycle-content materials and environmentally preferable products and services [DOE O 450.1@4.b.(3)]	Section 4.2.5
	The ISMS/EMS promotes the long-term stewardship of a site's natural and cultural resources throughout its operational, closure, and post-closure life cycle [DOE O 450.1@4.b.(2)]	Section 4.2.12
Implementation and operation	The ISMS/EMS provides for the integrated execution of programs for public health and environmental protection, pollution prevention, and compliance with applicable requirements [DOE O 450.1@4.a.(1)]	Section 2.1
Structure and responsibility	[Structure and responsibility is addressed in DOE P 450.4 <i>Safety Management System Policy</i> DOE P 411.1 <i>Safety Management Functions Responsibilities and Authorities Policy</i> DOE M 411.1C <i>Safety Management Functions, Responsibilities and Authorities</i> , and other DOE policies, procedures and requirements.]	Not Applicable
Training, awareness, and competence	The ISMS/EMS includes training to identify activities with significant environmental impacts [DOE O 450.1@4.a.(2)]	Section 2.2.2.1.5
	The ISMS/EMS includes training to manage, control, and mitigate the potential impacts of site activities with significant environmental impacts [DOE O 450.1@4.a.(2)]	Section 2.2.2.1.5
	The ISMS/EMS includes training to assess performance and implement corrective actions where needed [DOE O 450.1@4.a.(2)]	Section 2.2.2.1.5
Communication	The ISMS/EMS provides for obtaining, as appropriate, community advice relevant to aspects of "Greening the Government" Executive Orders, through new or existing outreach programs [DOE O 450.1@5.d.(3)]	Section 2.3.4
Environmental management	Approved ISMS descriptions have been updated, as necessary, to include EMS requirements [DOE O	ANL ISMS Section 1.2

system documentation	450.1@5.d.(2)]	
Document control	[Document control is addressed in other DOE policies, procedures and requirement.]	Not applicable
Operational control	The ISMS/EMS includes procedures to manage, control, mitigate the potential impacts of site activities with significant environmental impacts [DOE O 450.1@4.a.(2)]	Section 2.2.1
Emergency preparedness and response	[Emergency preparedness and response is addressed in other DOE policies, procedures and requirements.]	Section 2.2.2.1.4
Checking and corrective action	The ISMS/EMS provides for the evaluation of programs for compliance with applicable requirements [DOE O 450.1@4.a.(1)(c)]	Sections 2.2.1 and 4.1.1
	The ISMS/EMS provides for the evaluation of programs for public health and environmental protection [DOE O 450.1@4.a.(1)(a)]	Section 4.1.2
	The ISMS/EMS provides for the evaluation of programs for pollution prevention [DOE O 450.1@4.a.(1)(b)]	Section 2.2.1
	ISMS/EMS implementation is assessed as a component of the implementation of DOE P 450.5, Line Environment, Safety and Health Oversight [DOE O 450.1@5.b.]	Section 4.1.5
Monitoring and measurement	The ISMS/EMS includes policies, procedures to assess performance [DOE O 450.1@4.a.(2)]	Section 4.1.5
	Contractor ES&H self-assessment programs within the framework of DOE P 450.5 are established and continue to be effective [DOE O 450.1@5.d.(16)]	Section 4.1.5
	The ISMS/EMS ensures the early identification of, and appropriate response to, potential adverse environmental impacts associated with DOE operations, including, as appropriate, preoperational characterization and assessment and effluent and surveillance monitoring [DOE O 450.1@4.b.(4)]	Section 2.2.2.1.2
	The ISMS/EMS provides for the conduct of environmental monitoring, as appropriate, to support the site's ISMS, to detect, characterize, and respond to releases from DOE activities [DOE O 450.1@5.d.(14)]	Section 2.2.2.1.2
	The ISMS/EMS provides for the conduct of environmental monitoring, as appropriate, to assess impacts [DOE O 450.1@5.d.(14)]	Section 2.2.2.1.2
	The ISMS/EMS provides for the conduct of environmental monitoring, as appropriate, to estimate	Section 2.2.2.1.2

	dispersal patterns in the environment [DOE O 450.1@5.d.(14)]	
	The ISMS/EMS provides for the conduct of environmental monitoring, as appropriate, to characterize the pathways of exposure to members of the public; and to characterize the exposure and doses to individuals, and to the population [DOE O 450.1@5.d.(14)]	Section 2.2.2.1.2
	The ISMS/EMS provides for the conduct of environmental monitoring, as appropriate, to evaluate the potential impacts to the biota in the vicinity of the DOE activity [DOE O 450.1@5.d.(14)]	Sections 2.2.2.1.2 and 4.2.14
	The ISMS/EMS provides for the implementation of the analytical work supporting environmental monitoring using a consistent system for collecting, assessing, and documenting environmental data of known and documented quality [DOE O 450.1@5.d.(15)(a)]	Section 2.2.2.1.3
	The ISMS/EMS provides for the implementation of the analytical work supporting environmental monitoring using a validated and consistent approach for sampling and analysis of radionuclide samples to ensure laboratory data meets program-specific needs and requirements within the framework of a performance-based approach for analytical laboratory work [DOE O 450.1@5.d.(15)(b)]	Section 2.2.2.1.3
	The ISMS/EMS provides for the implementation of the analytical work supporting environmental monitoring using an integrated sampling approach to avoid duplicative data collection [DOE O 450.1@5.d.(15)(c)]	Section 2.2.2.1.3
Non conformance and corrective and preventive action	The ISMS/EMS includes policies, procedures to implement corrective actions where needed [DOE O 450.1@4.a.(2)]	Section 4.1.5
Records	[This is addressed in other DOE policies, procedures and requirements.]	Not applicable
Environmental management system audit/self assessment	The ISMS/EMS provides for the evaluation of programs for public health and environmental protection, pollution prevention, and compliance with applicable requirements [DOE O 450.1@4.a.(1)]	Section 4.1.5
	Contractor ES&H self-assessment programs within the framework of DOE P 450.5 are established and	Section 4.1.5

	continue to be effective [DOE O 450.1@5.d.(16)]	
Management review	The ISMS/EMS provides for the evaluation of programs for public health and environmental protection, pollution prevention, and compliance with applicable requirements [DOE O 450.1@4.a.(1)]	Section 4.1.5
	The ISMS/EMS includes policies, procedures to assess performance [DOE O 450.1@4.a.(2)]	Section 4.1.5
	The ISMS/EMS reviews annually, and updates (when appropriate) the site's measurable environmental goals, objectives, and targets [DOE O 450.1@4.a.(3)]	Section 4.3
	ISMS/EMS implementation is assessed as a component of the implementation of DOE P 450.5, Line Environment, Safety and Health Oversight [DOE O 450.1@5.b.]	Section 4.1.5
	Contractor ES&H performance objectives, performance measures, and commitments are reviewed through the annual ISM review process [established pursuant to DEAR 970.5223-1 (e)] [DOE O 450.1@5.d.(17)]	Section 4.1.5

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